Petition

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No. 81-_____

IN THE

Supreme Court of the United States

OCTOBER TERM, 1981

GENERAL MOTORS CORPORATION, *Petitioner,*

v.

ANNE M. GORSUCH, ADMINISTRATOR, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, *Respondent.*

PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA CIRCUIT

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QUESTIONS PRESENTED FOR REVIEW

1. Did the Court below err in not reversing regulations establishing technologically infeasible particulate emission standards for diesel-powered passenger cars and light-duty trucks that EPA promulgated pursuant to the wrong federal statutory authority?

2. Did the Court below err in sustaining regulations based upon an EPA prediction of technological feasibility even though years of extensive testing of experimental technology failed to produce evidence to support EPA's prediction as applied to millions of mass-produced vehicles?

3. Did the Court below err in relaxing the rigorous standard of judicial review applicable to EPA rulemaking on the basis that the "reasoned decisionmaking" required of EPA could be demonstrated theoretically rather than by factual evidence?

PARTIES BELOW

The parties to the proceedings in the United States Court of Appeals for the District of Columbia Circuit below are those identified in the caption of the case. Ms. Gorsuch has succeeded Douglas M. Costle as Administrator of the EPA. Mercedes-Benz of North America, Inc. (MBNA) and Volkswagen of America, Inc. (VWoA) intervened below in support of petitioner General Motors Corporation (GM) and the Natural Resources Defense Council, Inc. (NRDC) intervened in support of the respondent Administrator. This case, designated No. 80-1464 in the Court of Appeals, was consolidated with Case Nos. 80-1312, 80-1710 and 80-1712 in that Court. These cases involved two petitions for review filed by NRDC and one by MBNA naming the Administrator as respondent. GM, MBNA, VWoA, and NRDC participated as intervenors in one or more of the cases. Automobiles Peugeot intervened in behalf of the Administrator in No. 80-1712.

STATEMENT REGARDING CORPORATE PETITIONER PURSUANT TO SUPREME COURT RULE 28.1

General Motors Corporation

United States and Canadian Subsidiaries

General Motors Acceptance Corporation
Motors Insurance Corporation
General Motors of Canada, Ltd.

General Motors Corporation has numerous other domestic and foreign subsidiaries. The majority of these incorporate the General Motors name.

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PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA CIRCUIT

OPINIONS AND ORDERS BELOW

The action of the Administrator of the Environmental Protection Agency (EPA) is published at 45 Fed. Reg. 14496 (1980). A letter subsequently denying an administrative petition for reconsideration appears at 45 Fed. Reg. 48133 (1980). The April 22, 1981 per curiam opinion and May 27, 1981 orders of the Court of Appeals denying a combined Petition for Rehearing and Suggestion for Rehearing *En Banc* have not been published. Copies of the opinion and orders are included

in the appendix at App. 1a-62a. The opinion and the order denying rehearing were decided by a 2-1 vote, with Judges Mikva and Ginsburg comprising the majority and Judge Robb dissenting. The order denying rehearing *en banc* was decided by a 5-4 vote with Chief Judge Robinson and Judges Wright, Mikva, Edwards and Ginsburg comprising the majority. Judges Tamm, MacKinnon, Robb and Wilkey would have granted the suggestion. Judges McGowan and Wald did not participate in this order.

This petition is filed this 31st day of July, 1981, approximately one month prior to the applicable filing deadline because petitioner General Motors urgently needs the relief requested herein.

JURISDICTION

The jurisdiction of the Court of Appeals was invoked pursuant to Section 307 of the Clean Air Act, 42 U.S.C. §7607. The jurisdiction of this Court is invoked under 28 U.S.C. §1254(1) and 28 U.S.C. §1651.

The Court of Appeals' judgment was entered on April 22, 1981, App. 2a. That Court denied a timely Petition For Rehearing And Suggestion For Rehearing *En Banc* on May 27, 1981, App. 59a-62a.

STATUTES INVOLVED

The pertinent sections of the Clean Air Act involved in this appeal are:

Section 202(a)(1), 42 U.S.C. §7521(a)(1), which requires the Administrator to prescribe standards applicable to the emission of any air pollutant from new motor vehicles, which in his judgment causes or contributes to air pollution which may reasonably be antiticipated to endanger public health or welfare.

Section 202(a)(2), 42 U.S.C. §7521(a)(2), which requires that standards prescribed under Section 202(a)(1) shall take ef-

fect after such period as the Administrator finds necessary to permit the development and application of the requisite technology, giving appropriate consideration to cost.

Section 202(a)(3)(A)(iii), 42 U.S.C. §7521(a)(3)(A)(iii), which requires the Administrator to prescribe standards for emissions of particulate matter from heavy-duty vehicles* manufactured during and after 1981. The standards must reflect the greatest degree of emission reduction achievable through the application of technology that the Administrator determines will be available, considering cost and other factors. This Section also requires that such standards take effect as expeditiously as practicable taking into account the period necessary for compliance.

Section 307(d)(9), 42 U.S.C. §7607(d)(9), which permits the court to reverse actions of the Administrator found to be arbitrary, capricious, an abuse of discretion, contrary to the Constitution, in excess of statutory authority or short of statutory right, or without observance of procedure required by law.

The texts of these provisions are set forth verbatim in the appendix at App. 63a-74a.

CONCISE STATEMENT OF THE CASE

This case is a challenge to regulations promulgated by the Administrator of the Environmental Protection Agency (EPA).[1] The regulations establish particulate[2] emission stand-

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* The Court below properly construed this provision as applying only to heavy-duty vehicles although the words "heavy-duty" do not appear in the statutory text. *See*, "Concise Statement of the Case," *infra*.

[1] Standard for Emission of Particulate Regulation for Diesel-Fueled Light-Duty Vehicles and Light-Duty Trucks, 45 Fed. Reg. 14496 (1980) (amending 40 C.F.R. Part 86, Subparts A, B and G), App. 75a.

[2] Particulates are non-gaseous constituents of the vehicle exhaust. Because particulate emissions from current gasoline engines are relatively low, EPA limited the applicability of its regulations to diesel engines.

ards for new diesel-powered light-duty vehicles (cars and light trucks). The standards first become effective in model year 1982 at a level of 0.60 grams per mile (g/mi.) both for cars and light trucks. Because it does not oppose reasonable regulations, GM has not challenged these standards.

However, the regulations also provide for substantial (200 percent) increase in stringency to a level of 0.20 g/mi. for cars and 0.26 g/mi. for light trucks beginning in model year 1985. The 1985 standards, requiring an unknown new technology, are the basis for the GM challenge.

The technology needed to comply with the 1985 standards has not been developed despite diligent research efforts by the industry. Moreover, pursuant to normal scheduling practices, the time for ordering the tooling required to mass-produce the technology necessary to comply with the regulations already has expired. Thus, manufacturers will be unable to produce diesel cars and light trucks beginning in model year 1985 if the regulations remain in force, thereby nullifying efforts to achieve national energy conservation goals through the availability of these inherently more fuel-efficient products.[1] GM looks to this Court to prevent this result.

In promulgating these standards, which it admitted were not feasible (*see, e.g.*, 45 Fed. Reg. at 14498), EPA relied on the wrong provision of the Clean Air Act, §202(a)(3)(A)(iii), which calls for standards to be set for heavy-duty vehicles, not light-duty vehicles, at a level requiring the "greatest degree of emission reduction achievable." The Court below correctly held that EPA's statutory interpretation was wrong and adopted the interpretation advanced by GM. *Natural Resources Defense Council, Inc.* v. *Costle*, No. 80-1312 (con-

[1] In recognition of the significant energy saving potential of diesel technology (a 25-50 percent fuel efficiency advantage over gasoline engines, *e.g.*, 45 Fed. Reg. 5480, 5493 (1980)), Congress has acknowledged that the public has a definite stake in the continued availability of diesel-powered vehicles to serve a diverse variety of individual transportation needs. *See* H.R. Rep. No. 294, 95th Cong., 1st Sess. 250 (1977), *reprinted in* [1977] U.S. Code Cong. & Ad. News 1077, 1328.

solidated with Nos. 80-1464, 80-1710, 80-1712), Slip op. at 16 (April 22, 1981) [hereinafter cited as Slip op.], App. 16a. This "technology-forcing"[4] provision, upon which EPA specifically relied (EPA Regulatory Analysis at 2, 31, App. 151a, 152a), was intended by Congress to apply exclusively to *heavy-duty trucks*. The Court below so held, finding that "congressional concern over vehicular particulate emissions focused on heavy-duty vehicles [because they were] the major source of the problem. . . ." Slip op. at 13, App. 13a.

GM does not dispute the Court's construction of §202(a)(3)(A)(iii) as applying only to heavy-duty vehicles. GM alleges error, however, in the failure of the Court of Appeals to remand the case to EPA to establish *light-duty* particulate standards pursuant to the criteria of the *appropriate* Clean Air Act provisions (*i.e.*, §§202(a)(1) and (2)).

Had EPA embarked from the proper statutory criteria of §§202(a)(1) and (2), it could not reasonably have set the technologically infeasible 1985 particulate standards. These provisions, unlike §202(a)(3)(A)(iii), do not specifically mandate "expeditious" promulgation of particulate standards reflecting the "greatest reduction achievable." Rather, they provide general authority to establish emission standards with the proviso that such standards are to become effective "after" a period of time found by EPA to be "necessary" to "permit" the "development and application" of the requisite emission control technology. §202(a)(2).

By its exclusive reliance on the mandate of §202(a)(3)(A)(iii), EPA resolutely ignored the more deliberate approach to standard-setting required by §§202(a)(1) and (2). Because the excessive stringency of the 1985 standard is a direct result of EPA's attempt to satisfy the wrong set of statutory criteria, the Court below erred by failing to remand.

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[4] EPA expressly labeled the standards it promulgated under §202(a)(3)(A)(iii) "technology-forcing." 45 Fed. Reg. at 14498, App. 84a.

For a vivid illustration of the difference between these distinct sources of statutory authority, GM urges this Court to conduct a side-by-side comparison of the pertinent language of §§202(a)(1) and (2) and §202(a)(3)(A)(iii), *infra*, at 11 n.9.

The parties and the Court below recognized that compliance with the 1985 standards would require a new, complex and unproven emission control technology, known as a "trap-oxidizer," that remains in an experimental stage of development despite many years of diligent investigation and experimentation.[5] The trap-oxidizer must be designed to be durable enough to withstand the extreme heat of repeated regenerations and the pressures generated in the exhaust system over the lifetimes of vehicles in actual use.[6]

EPA and the Court below mistakenly theorized that because the standards do not take effect until model year 1985, manufacturers had ample time to perfect trap-oxidizer tech-

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[5] Conceptually, a trap-oxidizer consists of a filter designed to catch and hold particulates housed in a container that is installed at some location in the diesel vehicle exhaust system such that the exhaust stream from the engine to the tailpipe must pass through this "trap." An efficient trap may collect over a gallon of particulates every thousand miles. EPA Regulatory Analysis at 48. Once collected, particulates must be disposed of periodically in order to "regenerate" or restore the trap mechanism to an efficient operating condition.

In theory, trap-oxidizers generally would be larger than the catalytic converter installed on current gasoline-powered cars and would operate like a small incinerator or furnace, periodically burning up collected particulates at extremely high temperatures (*e.g.*, 900-1200 F.).

This incineration process must be initiated and controlled in a fashion that accounts for a wide range of variations in the rate of particulate accumulation based on individual driving habits, terrain and other factors. Thus, initiation and control will require the use of sophisticated electronic or thermal sensors and computer technology.

[6] The statutorily defined "useful life" of light-duty vehicles is "five years or fifty thousand miles (or the equivalent) whichever first occurs." §202(d)(1). As the Court below noted, however, EPA believes that a trap-oxidizer should last at least 100,000 miles. Slip op. at 29 n. 26, App. 29a.

nology. This assumption is demonstrably incorrect. GM already is behind schedule.

Production of 1985 model year vehicles begins in July of 1984. Prior to production, 18 months generally are consumed in fulfilling EPA emissions certification requirements (*i.e.*, beginning approximately in January, 1983). Prior to the commencement of certification, research and development must have culminated in an acceptable final design. The tools and machinery necessary to manufacture the device that emerges (*if* it emerges) can only be procured after such final design has been identified. Whether tools are manufactured internally or purchased from an outside supplier, time is required to design and build these tools to exacting specifications and to install them in assembly plants. Given normal development time, based on good engineering practice and the inherent complexity of a new, unproven technology, GM should have placed orders for such tools in *June, 1981* to minimize the risks of bringing trap-oxidizers to market by model year 1985.

However, no acceptable final design has emerged and with each passing day lead time inexorably vanishes. There are no shortcuts to viable solutions. Invention cannot be scheduled. The risks of failure, recalls and other potential adverse consequences attributable to undue haste must be borne in mind constantly.

The illusion of substantial lead time to comply with the 1985 standards evaporates when measured against the practical reality that there are vital steps in the lead time process that remain unfinished or not even begun.

In predicting that the critical unresolved issue of trap-oxidizer durability could be resolved successfully within the lead time necessary to apply the technology in the manufacture of 1985 model vehicles, EPA and the Court below ignored or dismissed as "anecdotes" (*e.g.*, Slip op. at 35, App. 35a) an overwhelming number of tests resulting in complete failure and relied almost exclusively on a single GM test, involving a vehicle lasting only 12,800 miles, which the parties

and the Court agree constitutes the "best" (*i.e.*, least negative) evidence regarding the durability issue.[7]

Judge Robb, dissenting, emphasized the absence of any support in the administrative record for the EPA prediction. He concluded that "pious hope and speculation cannot take the place of evidence." Slip op. (dissent) at 3, App. 58a.

The majority, however, affirmed the Agency prediction pursuant to a novel standard of review for technological feasibility cases. Under this new legal standard, EPA need only answer "theoretical objections," identify the "major steps" necessary to refine the technology and advance "plausible reasons" to support its technical determinations. Slip op. at 26, App. 26a.

In arriving at its final dispositive conclusion that EPA had provided "plausible reasons" for believing that these issues could be resolved in time to permit the use of trap-oxidizers by model year 1985, the majority relied solely on the test of the single experimental Opel vehicle in holding that perceived "current progress and past achievements" were sufficient to constitute "plausible reasons." Slip op. at 33, App. 33a.

GM now seeks final review in this Court. Approximately two years have passed since the administrative record in this matter was closed. During this period, GM not only has exhausted every available administrative and legal remedy,[8] but

[7] This test was only one among thousands conducted by GM, other light-duty diesel manufacturers and suppliers and EPA. *See generally*, Slip op. (dissent) at 1, 2, nn. 1, 2 and accompanying text, App. 56a-58a. *See* n. 16, *infra*.

The test relied on by EPA and the majority below involved a solitary GM Opel vehicle equipped with a simple trap and driven on a schedule that did not include any hard accelerations, hills or speeds in excess of 45 miles per hour. The vehicle lasted only 12,800 miles before the trap filter deteriorated and lost its effectiveness. This unimpressive result continues to constitute the "best" evidence of trap-oxidizer durability.

[8] Following publication of the final rule, GM sought and was denied administrative reconsideration by EPA. 45 Fed. Reg. 48133 (1980), App.

has continued to exercise diligent efforts in its comprehensive investigations of trap-oxidizer technology. Neither EPA nor the Court below has questioned GM's demonstration of the utmost good faith in seeking to resolve the difficult technological problems confronted in these investigations; in fact, to the extent that *evidence* has had any bearing on these proceedings, most of it was supplied by GM.

However, in response to allegations by the majority below that GM was unduly pessimistic regarding the rate and nature of technological progress (*e.g.*, Slip op. at 37 n. 31, 43, App. 37a), GM wishes to inform this Court that, despite the passage of time, the state of the administrative record as of the date of this petition remains virtually unchanged: *insufficient progress has been made to meet 1985 model start of production.* GM stands ready to supply confirmation of this assertion to this Court, the Court of Appeals or to EPA, by affidavit, submission of evidence, or in such other manner as this Court deems necessary and appropriate.

REASONS FOR GRANTING THE WRIT

I. THE MAJORITY BELOW ERRONEOUSLY UPHELD EPA EMISSION STANDARDS DESPITE EPA'S RELIANCE ON THE WRONG SOURCE OF FEDERAL STATUTORY AUTHORITY

A. EPA Erred When It Promulgated The "Technology-Forcing" Particulate Standards For Light-Duty Diesel-Powered Vehicles Under §202(a)(3)(A)(iii)

EPA conceded that it promulgated stringent "technology-forcing" particulate standards for light-duty vehicles under §202(a)(3)(A)(iii). That provision, however, applies only to

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106a. GM filed a petition for review in the United States Court of Appeals for District of Columbia Circuit. With Judge Robb dissenting, Judges Mikva and Ginsburg affirmed the rule. GM then filed a combined Petition for Rehearing and Suggestion for Rehearing *En Banc*. Rehearing was denied 2-1 and rehearing *en banc* was denied by a narrow 5-4 margin. Judges Robb, Tamm, Wilkey and MacKinnon voted to grant rehearing *en banc*.

heavy-duty vehicles, as the Court below held. The Agency mistakenly relied on what it described as the "plain language" of this provision (EPA Br. at 55, App. 180a), and ignored §§202(a)(1) and (2), which expressly authorize EPA to establish emission standards for all vehicles. In the Court of Appeals, GM argued that although §§202(a)(1) and (2) would authorize EPA to promulgate particulate standards, the "technology-forcing" standards actually promulgated by EPA did not satisfy the criteria of those provisions.

The majority's treatment of the substantive legal issue of the proper statutory authority for the 1985 standards (Slip op. at 10-17, App. 10a-17a) is nothing short of perplexing. Although the Court fully embraced GM's analysis of law and legislative history in concluding that EPA's reliance on §202(a)(3)(A)(iii) was *wrong* (Slip op. at 16, App. 16a), it omitted the next logical step of remanding the case to the Agency. The result of this failure to remand is that GM and other manufacturers continue to suffer the egregious consequences of attempting to meet the technologically infeasible 1985 particulate standards that could not reasonably have been promulgated under the proper statutory authority.

Reciting the highlights of GM's analysis of the Act and its legislative history, the majority agreed that statutory language supporting the superficial applicability of §202(a)(3)(A)(iii) should not be read in isolation. Slip op. at 12, App. 12a. The majority then noted that in 1977, Congress became impatient with EPA's failure (since 1970) to promulgate a particulate standard and enacted the mandatory language of §202(a)(3)(A)(iii). Slip op. at 13, App. 13a. The majority correctly interpreted the legislative history accompanying that enactment:

> The 1977 Senate report [S. REP. NO. 127, 95th Cong., 1st Sess. 67 (1977), *reprinted in* 3 LEGISLATIVE HISTORY 1441] illustrates that *congressional concern* over vehicular particulate emissions focused on *heavy-duty vehicles*. They are the *major source of the problem*. . . .

Slip op. at 13, App. 13a (emphasis supplied).

As a matter of policy, Congress decided to require EPA to regulate *heavy-duty* particulate emissions. The Court below concluded its review of legislative history with the following salient point: ". . . Congress did *not* intend, in adding section 202(a)(3)(A)(iii) to mandate adoption of particulate standards for *light-duty vehicles.*" Slip op. at 15, App. 15a (emphasis supplied). Nevertheless, the Court condoned EPA's error in relying on this provision.

B. The Court Of Appeals Erred When It Upheld The Standards Despite EPA's Error Of Law

The majority noted that EPA could have invoked its general standard-setting authority (§§202(a)(1) and (2)) and found that EPA had made the threshold findings required pursuant to that authority despite its express reliance on §202(a)(3)(A)(iii). Slip op. at 16-17, App. 16a-17a.

However, the majority omitted *any* analysis of the most critical differences between these two distinct sources of statutory authority.[9] EPA admitted its heavy reliance on the

[9] The pertinent text of the general standard-setting provisions, §§202(a)(1) and (2), and the specific "technology-forcing" heavy-duty particulate provision, §202(a)(3)(A)(iii), is set forth below:

§§202(a)(1) and (2): The Administrator shall by regulation prescribe (and from time to time revise) in accordance with the provisions of this section, standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or . . . engines, which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare. . . .

(2) Any [such] regulation . . . shall take effect *after such period* as the Administrator finds *necessary to permit the development and application of the requisite technology*, giving appropriate consideration to the

§202(a)(3)(A)(iii): The Administrator shall prescribe regulations under [§202(a)(1)] applicable to emissions of particulate matter from classes or categories of vehicles manufactured during and after model year 1981 (or during any earlier model year, if practicable). Such regulations shall contain standards *which reflect the greatest degree of emission reduction achievable* through the application of technology which the Administrator determines will be available for the model year to which such standards apply, giving appropriate consideration to [cost, noise, energy and safety factors]. Such standards *shall be promulgated and shall take effect as expeditiously*

language "*greatest degree* of emission reduction achievable" and "take effect as *expeditiously* as practicable" (§202(a)(3)(A)(iii) (emphasis supplied))[10] as its basis for standards that it *expressly labeled* "technology-forcing." 45 Fed. Reg. 14496, 14498 (1980). Sections 202(a)(1) and (2), however, do not contain these criteria. Curiously, the majority's paraphrasing of §202(a)(3)(a)(iii) in its analytical synopsis of statutory authority omits the "greatest reduction" language, thereby creating the illusion that these disparate provisions are synonymous.[11]

It is even more curious that this language was deleted from a citation advanced in support of the proposition that Congress required EPA to project future technological advances despite the inherent uncertainty of such projections. The majority opinion quoted EPA's Regulatory Analysis:

> Nevertheless, . . . EPA has concluded that it is absolutely necessary to issue standards which motivate the private sector to maximize its efforts in reducing particulate emission from light-duty vehicles. [Citation omission]

Slip op. at 19, App. 19a. The EPA document cited by the Court discloses that the majority used the ellipsis to delete EPA's reference to the critically significant statutory language set forth in italics below:

> Nevertheless, *to fulfill the 'greatest degree of emission reduction' mandate of the Clean Air Act*, EPA has concluded that it is absolutely necessary to issue standards which motivate the private sector to maximize its efforts

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cost of compliance within such period. (Emphasis supplied).

as practicable taking into account the period necessary for compliance. (Emphasis supplied).

[10] *E.g.*, EPA Regulatory Analysis at 2, 31, App. 151a, 152a.

[11] The language does appear in the full citation in a footnote. Slip op. at 11 n. 10 and accompanying text, App. 11a.

> in reducing particulate emissions from light-duty vehicles. [Citation omitted]

Compare Slip op. at 19, App. 19a *with* EPA Regulatory Analysis at 32, App. 154a.[12] GM is, of course, uncertain why the majority below deleted this language from its quotation of EPA's Regulatory Analysis. In any event, because §202(a)(3)(A)(iii) applies only to heavy-duty vehicles, there *is no "greatest reduction" mandate* creating an "absolute necessity" for standards that "motivate" the industry to "maximize" efforts to control *light-duty* particulate emissions. Nor has there been any finding by Congress or by EPA that there is a *need* for such stringent standards for *light-duty diesel vehicles.*

Whatever the reason for omitting the legally significant criteria relied on by EPA, the effect of the omission is that the majority "legislated" the quoted criteria from §202(a)(3)(A)(iii) into §§202(a)(1) and (2). Certainly, as this Court has recognized in *Industrial Union Dep't* v. *American Petroleum Inst.*, 48 U.S.L.W. 5022, 5037 (July 2, 1980) (Burger, C.J., concurring), and in the recent case of *American Textile Mfrs. Inst.* v. *Donovan*, 49 U.S.L.W. 4720, 4733-34 (June 17, 1981), "the judicial function does not extend to substantive revision of regulatory policy."[13]

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[12] This deletion is all the more perplexing in light of the Court's assertion in the course of rejecting NRDC's contentions later in the opinion: "Although we have held that the proper statutory basis for the EPA's power to issue particulate standards for light-duty vehicles is the general authority of section 202(a)(1) [citation omitted], the *EPA viewed itself as bound by the explicit mandate of section 202(a)(3)(A)(iii) to require 'the greatest degree of emission reduction achievable.'* " Slip op. at 39-40, App. 39a-40a (emphasis supplied).

[13] The Court below transgressed the fundamental principle that "a court is not permitted to distort a statute's meaning in order to make it conform with the Justices' own view of sound social policy." *Industrial Union Department* v. *American Petroleum Inst.* 48 U.S.L.W. 5022, 5043 (July 2, 1980) (Marshall J., dissenting). It cannot avail itself of the words of Mr. Chief Justice Burger in *Tennessee Valley Authority* v. *Hill*, 437 U.S. 153, 184 (1978): "the totality of congressional action makes it abundantly clear that the result we reach today is wholly in accord with both the words of the statute and the intent of Congress."

C. This Court Should Remand And Direct The Agency To Promulgate Appropriate Standards Under §§202(a)(1) And (2)

EPA acted under the misconception that the stringent particulate standards it set for light-duty vehicles were essential to assure the *greatest reduction* achievable and were required to take effect "expeditiously" in 1985. These constraints, which EPA erroneously believed should govern its standard-setting task, simply do not exist in §§202(a)(1) and (2). The 1985 standard upheld by the Court "forces" the development of a technology that remains to be invented and requires its use in light-duty vehicles as if §202(a)(3)(A)(iii) did apply. The Court overlooked the significance of the EPA error and the resultant need to remand the case for standard-setting under the criteria of §§202(a)(1) and (2).

The Court of Appeals thus contravened the rule that "an administrative order cannot be upheld unless the grounds upon which the agency acted in exercising its powers were those upon which its action can be sustained." *SEC* v. *Chenery Corp.*, 318 U.S. 80, 95 (1943). Further, "[w]hen an administrative agency has made an error of law, the duty of the Court is to 'correct the error of law committed by that body, and after doing so to remand the case to the [agency] so as to afford it the opportunity of examining the evidence and finding the facts as required by law.'" *NLRB* v. *General Pipefitters, Local No. 638*, 429 U.S. 507, 522 n. 9 (1977). The Court of Appeals clearly breached this fundamental duty in failing to remand to permit EPA to cure the legal defect in its standards by promulgating standards to become effective only "after" a period "necessary" to "permit" development and application of requisite technology (§§202(a)(1) and (2)) to replace the "technology-forcing" standards it established under §202(a)(3)(A)(iii).

Accordingly, issuance of the writ requested by GM is necessary to resolve an important legal issue involving incomplete and improper application of a federal statute and to effectuate this Court's inherent powers of supervision in such matters. Surely a federal court of appeals, particularly one entrusted by Congress to be the sole forum for resolution of significant issues arising under the Clean Air Act and similar federal statutes, must exercise greater care than was exercised here to correctly interpret and *apply* those statutes, in addition to offering some rational *explanation* of its decision in a manner that accurately reflects adherence to the perceived intent of the Congress.[14]

It is axiomatic that courts may not presume to usurp a legislative function. Neither are they justified in thoroughly ignoring the plain meaning of a federal statute when that statute is expressly relied upon by an agency as the sole legal basis of its defense. *Tennessee Valley Authority* v. *Hill; SEC* v. *Chenery Corp., supra.* The majority's failure to acknowledge the causal relationship between the level and timing of EPA's 1985 particulate standards and significant differences in the criteria of §202(a)(3)(A)(iii) and the criteria of §§202(a)(1) and (2), despite its correct interpretation of the policy considerations underlying the enactment of these provisions, is contrary to both of these precepts and must be scrutinized rigorously by this Court if the true meaning of *judicial* review is to be preserved.

The need for review by this Court becomes even more compelling when the administrative record of this matter is

[14] *See generally, Vermont Yankee Nuclear Power Corp.* v. *Natural Resources Defense Council, Inc.*, 435 U.S. 519 (1978). In delivering the opinion of the Court in that case, Mr. Justice Rehnquist observed in dictum that:

> Since the vast majority of challenges to administrative agency action are brought to the Court of Appeals for the District of Columbia Circuit, the decision of that court in this case will serve as precedent for many more proceedings for judicial review of agency actions than would the decision of another Court of Appeals.

435 U.S. at 537 n. 14.

considered. Argument II, *infra*, presents a clear illustration of the simple fact that there is insufficient *evidence* to sustain EPA's 1985 particulate standards under *either* of the foregoing statutory authorities.

II. THE MAJORITY ERRONEOUSLY CONCLUDED THAT THERE WAS SUFFICIENT EVIDENTIARY SUPPORT FOR EPA'S PREDICTION OF TECHNOLOGICAL ACHIEVABILITY

In his dissent below, Judge Robb succinctly summarized the salient contents of the record, including EPA's purported reasons for concluding that its 1985 standards were achievable, and concluded:

> In my opinion, these exhortations to the manufacturers and the EPA's vaguely articulated faith that a 'design can be optimized' soon do not amount to 'plausible reasons' for believing that each of [the necessary] steps can be completed in the time available, within the meaning of the majority's standard. Pious hope and speculation cannot take the place of evidence.

Slip op. (dissent) at 3, App. 58a.

The majority, on the other hand, erroneously concluded that extreme deference to EPA was warranted and confined its "review" of the *record* to a perfunctory reiteration of EPA's speculative conclusions.[15] Based on a grossly erroneous impression that the " 'base hour' for commencement of production is relatively distant" (Slip op. at 23, App. 23a), the majority engaged in a wholesale adoption of EPA's vague and unsupportable assurances that trap-oxidizer technology "could" be available by 1985 if only manufacturers would devote "sufficient" resources to resolving the remaining technological problems. The simple fact is that the answers

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[15] The majority also fell prey to EPA's thoroughly misleading tactic of misstating GM's arguments in terms that would effectively preclude *any* standard based on prediction. Any fair reading of this petition and GM's briefs below will disclose that GM's objections related only to *baseless* predictions that are the equivalent of "crystal ball gazing."

might never come, certainly not in time to permit installation of trap-oxidizers on 1985 light-duty diesel vehicles.

A. Durability

The parties and the Court below agree that trap-oxidizer durability is the most critical issue bearing upon achievability of the 1985 standard. *E.g.*, Slip op. at 31, App. 31a. The "best" *evidence* regarding this issue also is uncontroverted: A solitary GM Opel vehicle equipped with a metal mesh trap and driven on a schedule that did not include hard accelerations, hills, or any speeds in excess of 45 miles per hour.[16] The vehicle lasted only 12,800 miles before the trap material deteriorated and lost its effectiveness.

This single experimental vehicle is the slender *evidentiary* thread upon which EPA based its "confidence" that materials included in trap-oxidizers installed on 1985 mass-produced vehicles (produced beginning in July of calendar year *1984*) for use under the full range of *real-world* driving conditions will be capable of remaining efficient and withstanding ex-

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[16] A brief summary of GM data alone reveals that there are a number of tests demonstrating less than the "best" durability. For example, dynamometer engine tests on an Opel 2.1 liter engine at a simulated speed of 40 mph resulted in incineration at the outlet of a metal mesh trap after only 720 miles and melting and incineration of a similar trap after only 820 miles.

A number of full vehicle tests also resulted in trap destruction. Paper trap elements have been destroyed by fire on the Opel 2.1 liter engine after only 700 miles of operation on a relatively light driving schedule. GM Response at 82, 85, App. 146a. A dual paper trap element installed in a vehicle equipped with a 5.7 liter Oldsmobile engine ruptured after only 735 miles of operation. *Id.*

Metal traps, consisting of stainless steel elements coated with a ceramic material, also have been subject to catastrophic failure by fire after being operated in conjunction with the Opel engine for a period ranging from one to eight hours and accumulating as little as 40 miles on a light driving schedule. A dual trap of this sort installed on a vehicle equipped with an Oldsmobile 5.7 liter engine caught fire and was destroyed after only 200 miles of operation. GM Response at 94, 98, 99, App. 148a, 149a.

treme heat and pressure for 50,000 or even 100,000 miles of actual operation. This is not "evidence that [EPA's prediction] will correspond to reality" as required by the leading case of *International Harvester Co.* v. *Ruckelshaus*, 478 F.2d 615, 644 (D.C. Cir. 1973).

The majority repeatedly emphasizes the theoretical aspects of the EPA prediction (*see, e.g.*, Slip op. at 26, 28, 31, 36. App. 26a, 28a, 31a, 36a), to the exclusion of *practical* considerations, and effectively absolves the Agency of the obligation to consider the real-world implications of its standard. Slip op. at 31, App. 31a. Based on this tenuous foundation, the majority disposed of the durability issue not on the basis of *evidence* but rather based on a formulation holding that perceived "current progress and past achievements" are sufficient to constitute "plausible reasons" in support of the EPA prediction. Slip op. at 33, App. 33a.

Judge Robb correctly concluded that the majority failed to properly apply its own test. As in *International Harvester*, there is no "hard evidence to verify the accuracy" of the Agency's extrapolation of 12,000-mile durability on one experimental vehicle to a minimum 50,000-mile durability on an entire fleet of 1985 production vehicles. *Compare* Slip op. at 23 n. 19, App. 23a. Thus, in the absence of any effort to dispute the evidence relied upon by GM, the majority below improperly presumed to exercise its own brand of technical expertise in merely registering its agreement with EPA conclusions rather than reviewing the *record* before it.

B. Lead Time

The majority's analysis of the related issue of lead time contravenes the statutory directive of the general standard-setting provision that EPA emission standards under §202(a)(1) take effect only "after such period as the Administrator *finds necessary to permit the development and application* of the requisite technology." §202(a)(2) (emphasis

supplied).[17] The origins of this error may be traced to the legal deficiencies of the majority's novel and excessively deferential standard of review. *See* Argument III, *infra*.

Although the majority conceded that the time element introduced uncertainties that render the EPA prediction vulnerable to attack, it never reconciled this conclusion with its inordinate reliance on the notion that the Agency's discretion in making predictions of technological progress somehow expands in proportion to the amount of lead time available.[18] In short, the majority abdicated its reviewing role by accepting a "crystal-ball" projection premised on speculation rather than *evidence* solely on the basis of the superficial appearance of sufficient time in which to miraculously solve the technological problems.

The *evidence* regarding lead time, in particular an identification of the various steps that must be considered in seek-

[17] Slip op. at 26, App. 26a. Given the dearth of favorable evidence available and the admittedly *theoretical* and *conceptual* nature of trap-oxidizer technology, there is simply no basis for the majority's implied conclusion that the "ultimate practicabilty" of the device is undisputed. Slip op. at 26 n. 22, App. 26a. GM's inability to identify a suitable trapping material underscores the fallacy of attempting to "force" technology. *See* GM Br. at 36-37, App. 169a-170a. Similarly, the majority disposed of the issue of regeneration on the basis of minimal laboratory-type testing bearing no resemblance to real-world operation. *Compare* Slip op. at 35-36, App. 35a-36a, *with* GM Reply Br. at 16-17, App. 173a-174a. Also, despite the majority's condonation of EPA's approach to safety considerations, these considerations also bear on the ultimate practicability of trap-oxidizers. *Compare* Slip op. at 37 n. 31, App. 37a, *with* GM Reply Br. at 20-21, App. 177a-178a.

[18] Slip op. at 21, App. 21a. Moreover, it seems ironic that greater latitude should be afforded for prediction years in advance of a regulation when evidence to support the prediction is understandably sparse. Such an approach would operate as a disincentive to reasoned decisionmaking by an agency by offering lead time as a convenient "safety valve" to validate even the most ludicrous "prediction" based solely on whim. *Compare, International Harvester, supra*, 478 F.2d at 629 ("The Administrator's latitude for projection is *unquestionably limited* by relevant considerations of lead time needed for production.") (emphasis supplied) *quoted in* GM Br. at 17, App. 166a.

ing to understand that concept, was set forth in considerable detail in GM Br. at 34-38, App. 167a-171a; GM Reply Br. at 17-20, App. 174a-177a. Omitting any reference to the fact that actual production begins at least five months before calendar year 1985 (July, 1984) and that EPA emissions certification requirements (including a demonstration of 50,000-mile durability) usually consume 18 months prior to production (January, 1983), the majority adopted EPA's approach of fixing its sights solely on the 1985 date.

In fact, subtraction of 23 months from the beginning of 1985 in accordance with the above discussion of start-of-production and certification does not even begin to account for the numerous other time-consuming steps in the lead time process that relate more directly to the *development and application* of the *requisite* (*i.e.*, final production) technology within the meaning of the *finding* required by §202(a)(2). These include the further extensive research that is required, successful incorporation of a discrete device emerging from that research in a vehicle application for rigorous testing under real-world conditions, and the design, manufacture and installation of the tools necessary to produce and incorporate the technology in mass-produced vehicles for customer use.

Obviously, such tooling, which must be precision manufactured to exacting specifications allowing little margin for error, cannot even be ordered until a *final design* is selected. Given normal development time, based on good engineering practice and the inherent complexity of a new, unproven technology, GM should have ordered such tools in June, 1981 to avoid substantial product performance and financial risks of bringing trap-oxidizers to market by model year 1985.

No acceptable final trap-oxidizer design has yet been identified. GM remains at "square one," the *research* phase. Time spent in this phase of the lead time process necessarily compresses the time available for completion of the sequence of other essential steps in that process. Thus, GM *does not*

have until *1985* to avert the demise of light-duty diesel vehicles in that model year.

The majority's reliance on nice distinctions relating to the perceived *amount* of lead time available in this case was insufficient to dispose of the legal authorities relied on by GM in its briefs. The majority did not deny that a prediction must be *reasonable* regardless of when it takes effect (*see, e.g.*, Slip op. at 25, App. 25a) and cited no cases in which a prediction remotely similar to that reviewed here has been upheld on the basis of lead time or any other rationale.

Rather, the majority dismissed the applicability of the *International Harvester* case on the basis of their misguided hypothesis that the " 'base hour' for commencement of production is relatively distant." Slip op. at 23, App. 23a. As explained earlier, that hour is close at hand and no amount of contemplative "desk engineering" by EPA or the Court of Appeals will suffice to transform "theories" and "concepts" into tested and proven finished *products fit for public use.*

The question is not whether EPA's lead time prediction "can . . . possess the inescapable logic of mathematical deduction." Slip op. at 26, App. 26a. Rather, resolution of the lead time issue depends on careful consideration of the *evidence* regarding the status of development and a recognition that, in the absence of development, application and rigorous testing, the "concept" of a trap-oxidizer is useless in the "real world."

Moreover, the *amount* of lead time was not the dispositive element of the *International Harvester* decision. If it were, the Court of Appeals would have assumed the role of exercising technical expertise in a case-by-case determination of whether an agency has provided "enough" lead time, a role that the Court has repeatedly disclaimed. The salutary principle of that decision was that the *record* must support an agency prediction, not that the record can be ignored if there

is the superficial appearance of a substantial amount of lead time remaining.[19]

Similarly, the majority's attempt to distinguish analogous cases relied on by GM fails in two respects. First, it ignores the significant legal *principle* at stake here. Whether based on statistical techniques, mathematical deduction or physical evidence and whether one month or several years of lead time is provided, one thing is certain: a prediction of achievability must be reasoned and supported *by evidence in the record* rather than unadorned theory, intuition, hope or speculation. Second, specifically with respect to the amount of lead time available, the majority's conclusion that the instant case involves a uniquely greater amount of lead time is simply inaccurate.[20]

Finally, it must be emphasized that the comfort taken by the majority in EPA's "greater leeway to modify the standards" (*e.g.*, Slip op. at 22, 34, App. 22a, 23a) before 1985 is of little avail to manufacturers. Such a relaxation cannot ameliorate the grave economic consequences that already have been visited on manufacturers forced to spend vast sums by virtue of EPA's initial promulgation of unreasonable and improperly prescribed standards (*supra*, n. 19). More importantly, despite the fact that EPA appears to have had second

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[19] Moreover, EPA's reliance on the "safety valve" of subsequent relaxation and the majority's condonation of that approach flies in the face of statutory requirements that standards be achievable by their effective date *when promulgated* and ignores the fact that the grave economic consequences of such a relaxation that concerned the *International Harvester* Court may be different here in degree but not in kind. The loss of substantial investment in research directed toward achievement of an unreasonable standard when that standard is relaxed seriously prejudices all manufacturers.

[20] *See* Slip op. at 21-25, App. 21a-25a. For example, even in *International Harvester*, the Court remanded 1975 standards early in 1973. In *CPC International, Inc.* v. *Train*, 515 F.2d 1032 (8th Cir. 1975), *Hooker Chemical & Plastics Corp.* v. *Train*, 537 F.2d 620 (2d Cir. 1976) and *Tanner's Council of America* v. *Train*, 540 F.2d 1188 (4th Cir. 1976), decided in 1975 and 1976, the reviewing courts remanded *1983* standards.

thoughts on the validity of its earlier feasibility prediction (*see*, 46 Fed. Reg. 31677, 31678 (1981), announcing an EPA "study" of the standards), the stamp of approval already bestowed by the majority could operate as an obstacle to any meaningful reconsideration by the Agency.

Under the majority decision EPA is free to assume that it can "force" technology as vigorously under the general standard-setting provisions (§§202(a)(1) and (2)) as it had under §202(a)(3)(A)(iii) (*see* Argument I, *supra*), that virtually no evidence will be required to support its prediction and that the standard for judicial review of such a prediction has been relaxed substantially (*see* Argument III, *infra*). Under these conditions, it is difficult to imagine that EPA's belated "study" will result in anything other than a reaffirmation of its original crystal-ball projection.

III. THE COURT BELOW ERRONEOUSLY DILUTED THE TRADITIONAL ARBITRARY AND CAPRICIOUS STANDARD OF REVIEW APPLICABLE TO EPA REGULATIONS

Congress expressly stated that it expected courts to continue to undertake thorough review of the Administrator's actions:

> With respect to the 'arbitrary and capricious' scope of review retained in these [1977] amendments, the conferees intend that the courts *continue their thorough comprehensive review* which has characterized judicial proceedings under the Clean Air Act thus far.

H.R. REP. No. 564, 95th Cong., 1st Sess., 178 (1977), *reprinted in* [1977] U.S. CODE CONG. & AD. NEWS 1502, 1559 (emphasis supplied).[21] In *National Lime Ass'n* v. *EPA*, 627

[21] Congress also stated that it considered the "arbitrary and capricious" standard to be practically synonymous with the substantial evidence scope of review — a standard that traditionally has called for a searching review of agency action. H.R. REP. No. 564, 95th Cong., 1st Sess. 178 (1977), *reprinted in* [1977] U.S. CODE CONG. & AD. NEWS 1502, 1559. *See generally, Pacific Legal Foundation* v. *Dept. of Transportation*, 593 F.2d 1338, 1343, n. 35 (D.C. Cir. 1979).

F.2d 416 (D.C Cir. 1980), the Court below assessed Congress' declarations and observed that the "court and others have evinced a rigorous approach [to judicial review.]" *Id.* at 429.[22] It concluded that "[i]n enacting the Clean Air Act, Congress expressly approved the rigorous standard of review which the courts had theretofore applied to Agency decisions under the Clean Air Act." *Id.* at 430.

This Court has established the rule that judicial review of an administrative record should involve a "substantial inquiry" into the facts, one that is "searching and careful." *Citizens to Preserve Overton Park* v. *Volpe,* 401 U.S. 402, 416 (1971). Although there is a "presumption of regularity" owed to agency decisions (*id.* at 415), this presumption does not shield the agency from "thorough, probing, in-depth review." *Id.* In short, abject deference leading to mere "rubber-stamping" of agency conclusions is an insufficient judicial response. A court should not and need not "second-guess" an agency, but should examine thoroughly the *basis* in law and in fact for agency actions presented for review.[23]

The Court of Appeals inexplicably and erroneously diluted the rigorous standard of review applicable to the Agency's prediction of technological achievability. In *International Harvester,* this same Court of Appeals established that an agency acts arbitrarily and capriciously unless it carries the burden of adducing a reasoned presentation supporting the reliability of its prediction. Moreover, in *National Lime Ass'n,* the Court reiterated that the "[p]romulgation of standards based upon inadequate proof of achievability would defy

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[22] Included among the decisions of the courts were *International Harvester* v. *Ruckelshaus,* 478 F.2d 615 (D.C. Cir. 1973) and *Bunker Hill Co.* v. *EPA,* 572 F.2d 1286 (9th Cir. 1977).

[23] The Court below did conduct a partial examination of EPA's legal basis for the standards and found it wanting. *See* Argument I, *supra.* However, when it turned to the question of whether the Agency had a reasoned factual basis for the *finding* required by §202(a)(2) that the requisite technology could be *developed and applied* by model year 1985, the majority seemingly lost sight of any fair or meaningful standard of review.

the [Clean Air Act's] mandate against action that is 'arbitrary [and] capricious'. . . ." *National Lime Ass'n, supra*, 627 F.2d at 430.[24] The rigorous review of an agency's proof as evinced in *International Harvester* and *National Lime Ass'n* was entirely consistent with the thorough and comprehensive standard of review mandated by Congress. *See* H.R. REP. No. 564, 95th Cong., 1st Sess., 178 (1977), *reprinted in* [1977] U.S. CODE CONG. & AD. NEWS 1502, 1509.

The watered-down standard of review applied in the instant case relieves the agency of the burden of adducing evidence supporting the reliability of its prediction. Instead, the agency need only answer any "theoretical objections" of the manufacturers, identify the "major steps" necessary to refine the technology, and offer "plausible reasons" to explain why it believes those steps will be completed within the available lead time. Slip op. at 26, App. 26a. Despite its protestations to the contrary, the Court abdicated to the agency's judgment in technical matters when it invented this weakened standard of review. Certainly, it eviscerated the requirement in *International Harvester* that the agency must rely on *evidence* "to overcome a conclusion, of lack of available technology, supported *prima facie* by the only actual and observed data available, the manufacturers' testing." 478 F.2d at 648.

When analyzed in the cold light of reality, the "standard" of review applied below reveals itself as essentially no standard at all. In the realm of technological investigation and scientific inquiry, very few self-respecting scientists and engineers, whether employed by government, industry, academic or other institutions, would be comfortable with an admission that a given task is categorically *impossible*. It is the stock-in-trade of the technical community to formulate theories and hypotheses that require *testing* for verification. Thus, the ability to offer a "theoretical objection" to a given

[24] The author of the recent *National Lime* opinion, Judge Wald, did not participate in the order below denying GM's Suggestion for Rehearing *En Banc*. Judge Tamm, who joined in the *National Lime* opinion, voted to grant the suggestion.

technical proposition, prior to the completion of sufficient testing, will exist only in the rarest instances.

The "major steps" element of the standard of review applied below adds virtually nothing of substance to the Agency's deliberative process. All that is required of the Agency in order to "identify" the major remaining developmental steps in satisfaction of this element is consideration of the comments submitted during rulemaking and compilation of a list of the steps receiving the greatest emphasis from the commenters.

Finally, it is difficult to imagine a situation in which an agency will be unable to offer "plausible reasons" supporting a mere theory. If the agency is permitted to substitute theory and an enumeration of "major steps" for *evidence* in support of a prediction, judicial review of agency regulations becomes meaningless.

Perhaps the Court's failure to distinguish the requirements of §§202(a)(1) and (2) from those of §202(a)(3) (A)(iii) accounts for the relaxed standard of review applied below. Arguably, the strong "technology-forcing" Congressional mandate of §202(a)(3)(A)(iii) might warrant extreme reluctance on the part of the Court to interfere with EPA's "expeditious" pursuit of the "greatest degree of emission reduction achievable."

Here, however, the Court asserted that it was reviewing EPA action under §§202(a)(1) and (2), which require that standards take effect only "*after* such period as the Administrator finds *necessary* to *permit* the development and application of the requisite technology." §202(a)(2) (emphasis supplied). Application of the diluted standard of review invented below in the context of these statutory criteria is simply erroneous and unwarranted. EPA never made the required *finding*.

Moreover, the use of this novel standard of review is inherently prejudicial to GM and other light-duty diesel vehicle manufacturers. The minimal "review" undertaken by the

Court of Appeals in effect permissively vests EPA with authority to promulgate an excessively stringent particulate standard with virtually no evidentiary basis. As a consequence, vehicle manufacturers will continue to suffer the grave economic consequences that inevitably accompany such an unreasonable agency action.

CONCLUSION

Production of fuel-efficient diesel cars and light trucks will cease in model year 1985 if the regulations challenged here remain in force. Such a harmful result clearly is unwarranted in light of both the facts and the law governing the promulgation of the 1985 diesel particulate standards.

The Court of Appeals correctly determined that EPA's reliance on the specific heavy-duty particulate standard mandate of §202(a)(3)(A)(iii) was erroneous. However, without offering any rationale for its departure from the clear intent of Congress, the Court "legislated" the "technology-forcing" criteria relied on most heavily by EPA from that provision into the general standard-setting provisions, §§202(a) (1) and (2), under which authority for light-duty particulate standards was found to exist.

On this basis, stringent EPA standards expressly premised on a statutory mandate requiring the "expeditious" attainment of the "greatest degree of emission reduction achievable" were affirmed under a provision containing *no such mandate*. To the contrary, the essence of §§202(a)(1) and (2) is that, once the *need* for a standard has been identified by EPA[25] then any standard based on that need is not to take effect unless and until the requisite technology can reasonably be developed and applied.

Ignoring the pervasive character of the fundamental legal flaw in EPA's approach to the establishment of the challenged

[25] *Contra* §202(a)(3)(A)(iii) whereby Congress itself identified the need for *heavy-duty* particulate standards and directed EPA to move quickly to "force" technology in order to serve that need.

standards, the Court below erroneously determined that extreme deference was warranted and fashioned a mechanism for effectuating such deference in the form of a novel standard of review heretofore unknown in the annals of administrative law. This standard exalts theoretical premonitions over practical considerations and relieves the Agency of any obligation beyond the clerical function of listing the major steps remaining in the technological development process and the fabrication of superficially "plausible" reasons for believing that theory can become reality.

Assuming, *arguendo,* that this novel standard of review somehow does faithfully reflect the tenets of the traditional "arbitrary and capricious" standard, the majority below failed to apply its "plausible reasons" concept properly. Falling prey to the unsupportable urgings of EPA that the 1985 effective date gave manufacturers ample time to iron out some "insignificant" problems, the majority distilled years of intensive trap-oxidizer investigation yielding uniformly negative results into the simple assertion that "current progress and past achievements" support EPA's prediction. When the only *evidence* relied on by the Agency consists of a single low-mileage experimental vehicle, such a paucity of evidence fails to meet even the majority's "plausible reasons" test. Further, only an intuitive leap of unprecedented magnitude could explain the majority's seemingly contradictory conclusion that "room for interim adjustments" (Slip op. at 37, App. 37a) is a "plausible reason" for believing that EPA's prediction is valid in the first instance.

This case, perhaps like no other arising under the Clean Air Act, clearly illustrates the potential for harm and injustice that occurs in the absence of thorough and effective judicial review as a meaningful restraint on "crystal-ball" projections by EPA. Congress envisioned adherence to its express statutory directives and careful judicial review in order to preserve the balance that it sought to strike in the Clean Air Act. Neither of those ends is served by the majority decision below.

Absent this Court's exercise of its discretion to review this case in accordance with its supervisory power, the majority decision will stand as a monument to the prejudicial effects on industry of "rubber-stamp" judicial review. Despite the majority's implicit disagreement, GM continues to believe, with Judge Robb (and presumably at least three other Judges of the Court below who voted to grant rehearing *en banc*), that "[p]ious hope and speculation cannot take the place of evidence."

For all of the foregoing reasons, GM respectfully urges this Court to grant this petition for writ of certiorari.

Respectfully submitted,

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Appendix

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No. 81-_____

IN THE

Supreme Court of the United States

OCTOBER TERM, 1981

GENERAL MOTORS CORPORATION, *Petitioner,*

v.

ANNE M. GORSUCH, ADMINISTRATOR, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, *Respondent.*

On Petition For A Writ Of Certiorari To The United States Court Of Appeals For The District Of Columbia Circuit

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APPENDIX

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United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 80-1312

NATURAL RESOURCES DEFENSE COUNCIL, INC., PETITIONER

v.

U.S. ENVIRONMENTAL PROTECTION AGENCY,
DOUGLAS M. COSTLE, ADMINISTRATOR, RESPONDENT

MERCEDES-BENZ OF NORTH AMERICA, INC.,
GENERAL MOTORS CORPORATION,
VOLKSWAGEN OF AMERICA, INC., INTERVENORS

No. 80-1464

GENERAL MOTORS CORPORATION, PETITIONER

v.

DOUGLAS M. COSTLE, ADMINISTRATOR, UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY, RESPONDENT

VOLKSWAGEN OF AMERICA, INC.,
NATURAL RESOURCES DEFENSE COUNCIL, INC.,
MERCEDES-BENZ OF NORTH AMERICA, INC., INTERVENORS

Bills of costs must be filed within 14 days after entry of judgment. The court looks with disfavor upon motions to file bills of costs out of time.

No. 80-1710

MERCEDES-BENZ OF NORTH AMERICA, INC., PETITIONER

v.

DOUGLAS M. COSTLE, ADMINISTRATOR, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, RESPONDENT

NATURAL RESOURCES DEFENSE COUNCIL, INC., INTERVENOR

No. 80-1712

NATURAL RESOURCES DEFENSE COUNCIL, INC., PETITIONER

v.

DOUGLAS M. COSTLE, ADMINISTRATOR, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, RESPONDENT

AUTOMOBILES PEUGEOT, VOLKSWAGEN OF AMERICA, INC., INTERVENORS

Petition for review of an order of the Environmental Protection Agency

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Argued October 28, 1980

Decided April 22, 1981

David D. Doniger with whom *Richard E. Ayres* was on the Brief for Natural Resources Defense Council, Inc., petitioner in Nos. 80-1312 and 80-1712 and intervenor in Nos. 80-1464 and 80-1710.

William Weber, Jr. with whom *Thomas L. Arnett* and *Frazer F. Hilder* were on the brief for General Motors Corporation, petitioner in No. 80-1464 and intervenor in 80-1312.

Jose R. Allen, Attorney, Department of Justice, of the bar of the Supreme Court of Massachusetts, *pro hac vice*, by special leave of Court, and *Bruce Bertelsen*, Attorney, Environmental Protection Agency, of the bar of the Supreme Court of Michigan, *pro hac vice*, by special leave of Court, with whom *Angus MacBeth*, Acting Assistant Attorney General, *Donald W. Stever, Jr.*, Attorney, Department of Justice, *Patrick O'Hare* and *Gerald K. Gleason*, Attorneys, Environmental Protection Agency, were on the brief for respondents. *Nancy J. Marvel* also entered an appearance for respondents.

Patrick M. Raher with whom *David M. Gische* was on the brief for Mercedes-Benz of North America, intervenor in 80-1312 and 80-1464 and petitioner in 80-1710.

Herbert Rubin, *Thomas H. Truitt* and *Terrance Roche Murphy* were on the brief for Volkswagen of America, Inc., intervenor in 80-1312, 80-1464 and 80-1712.

Richard deC. Hinds and *Christopher Miller Klein* were on the brief for Automobiles Peugeot, intervenor in 80-1712.

Before: ROBB, MIKVA and GINSBURG, *Circuit Judges*.

Opinion for the Court filed by *Circuit Judge* MIKVA.

Opinion concurring in part and dissenting in part filed by *Circuit Judge* ROBB.

MIKVA, *Circuit Judge*: These consolidated cases present a variety of challenges to actions of the Environmental Protection Agency (EPA) in setting standards to govern emissions of particulate matter and oxides of nitrogen from diesel vehicles. The Natural Resources Defense Council (NRDC) argues that the agency's actions do not adequately protect the public health; General Motors Corporation (GM) and Intervenors Mercedes-Benz of North America, Inc., and Volkswagen of America, Inc., assert that the EPA did not give adequate consideration to safety factors, and that, in a variety of ways, the standards are too strict. Finding that the

agency has stated adequate reasons for its decisions, and that its actions are consistent with statute, we uphold the challenged regulations in their entirety.

I. The Regulatory Framework

The EPA is authorized by the Clean Air Act (Act)[1] to regulate emissions of harmful pollutants from motor vehicles. The Act itself specifies the quantity of acceptable emissions from light-duty vehicles for three classes of pollutants: carbon monoxide, hydrocarbons, and oxides of nitrogen. Act § 202(b)(1). Section 202(a)(1) of the Act confers on the EPA Administrator the general power to prescribe by regulation "standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines, which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare." These provisions are supplemented and qualified by various specific provisions relating to particular classes of vehicles or pollutants. *E.g.*, Act §§ 202(a)(3)(A)(i), 202(a)(3)(F), 202(b)(6)(A).

The statutory standard for hydrocarbon emissions from light-duty vehicles is an absolute one. For models manufactured from 1977 to 1979, hydrocarbon emissions may not exceed 1.5 grams per vehicle mile; for those manufactured from 1980 on, the standards must require a reduction of at least ninety percent from the emission standards applying in 1970. Act § 202(b)(1)(A). The

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[1] Sections of the Act, 42 U.S.C. §§ 7401-7642 (Supp. I 1977), are cited in this opinion by their designation in the Statutes at Large. The parallel United States Code citations for sections to which most frequent reference is made are:

Section 109—42 U.S.C. § 7409

Section 202—42 U.S.C. § 7521

Section 209—42 U.S.C. § 7543

Section 307—42 U.S.C. § 7607.

statutory standards for carbon monoxide and oxides of nitrogen are also absolute, but they are subject to a variety of waivers for certain manufacturers who lack the technological capacity to comply. *See* Act §§ 202(b)(1)(B), 202(b)(5), 202(b)(6).

The emission standards set by the EPA under its general regulatory power, in contrast, are "technology-based"—the levels chosen must be premised on a finding of technological feasibility. Section 202(a)(2) of the Act provides that standards promulgated under section 202(a)(1) shall not take effect until "after such period as the Administrator finds necessary to permit the development and application of the requisite technology."

The requirement that emission standards be technologically achievable highlights the need for the EPA's power to divide the broad spectrum of motor vehicles into classes or categories. *See* Act §§ 202(a)(1), 202(a)(3)(A)(iv). Manufacturers produce a wide variety of motor vehicles of different sizes, some using different engine technologies resulting in unusual emission characteristics. In particular, diesel engines use a different fuel, emit exhaust at a lower temperature, and produce a different distribution of pollutants than traditional gasoline engines. For example, diesel carbon monoxide levels are typically lower than those from gasoline vehicles, *see* 45 Fed. Reg. 5480, 5493 n.192 (1980), but diesel vehicles produce particulate emissions at thirty to seventy times the rate of gasoline vehicles, *see* 45 Fed. Reg. 14,496 (1980), and also produce higher levels of the unregulated pollutants sulfur dioxide and benzo(a)-pyrene, *see* 45 Fed. Reg. 5480, 5489 (1980).

The present challenges concern the EPA's promulgation of standards governing particulate [2] emissions from

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[2] "Particulates" is a generic term for solid particles that can become suspended in the atmosphere. *See* U.S. Dep't of

light-duty diesel vehicles and light-duty diesel trucks,[2] and the EPA's waiver of the statutory standard for

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Health, Education, and Welfare, Air Quality Criteria for Particulate Matter 5-8 (National Air Pollution Control Administration Publication No. AP-49) (1969). The EPA has established National Ambient Air Quality Standards for particulates under section 109 of the Act to protect the public health. 40 C.F.R. § 50.6 (1979). Measurements for the purposes of determining compliance with this standard utilize a glass fiber filter capable of collecting particles whose diameters range from 0.1 to 100 micrometers. 40 C.F.R. pt. 50 App. B. (1979).

[3] The statute defines only the term "heavy-duty vehicles":

> The term "heavy-duty vehicle" means a truck, bus, or other vehicle manufactured primarily for use on the public streets, roads, and highways (not including any vehicle operated exclusively on a rail or rails) which has a gross vehicle weight (as determined under regulations promulgated by the Administrator) in excess of six thousand pounds. Such term includes any such vehicle which has special features enabling off-street or off-highway operation and use.

Act § 202(b)(3)(C) (added by the Clean Air Act Amendments of 1977, Pub. L. No. 95-95, § 223, 91 Stat. 685). This court held in *International Harvester Co. v. Ruckelshaus*, 478 F.2d 615, 639-40 (D.C. Cir. 1973), that the legislative history of the 1970 amendments demonstrates that the term "light-duty vehicles" as used in section 202(b) is essentially synonymous with "passenger cars." The EPA's current definition of "light-duty vehicles" includes any "passenger car or passenger car derivative capable of seating 12 passengers or less." 40 C.F.R. § 86.077-2 (1980). The definition of "light-duty truck" applicable to the particulate regulations, *see* 45 Fed. Reg. 14,496 n.1 (1980); 40 C.F.R. §§ 86.081-2(a), 86.080-2 (1980), is as follows:

> "Light-duty truck" means any motor vehicle rated at 8500 pounds [gross vehicle weight rating] or less which has a vehicle curb weight of 6000 pounds or less and which has a basic vehicle frontal area of 45 square feet or less, which is:

oxides of nitrogen [4] for light-duty vehicles.[5] The EPA's particulate standard and NO_x decisions are appropriately linked in the present proceeding because current technology creates an unfortunate trade-off between particulate control and control of oxides of nitrogen. The primary technique used today for reducing NO_x emissions is exhaust gas recirculation (EGR). While lowering the NO_x content of the exhaust, EGR increases the particulate content, and "the greater the EGR rate, the greater the increase in particulate emissions." Environmental Protection Agency, Regulatory Analysis [of] Light-Duty Diesel Particulate Regulations 33 (1980) [hereinafter cited as Regulatory Analysis], Joint Appendix (J.A.) 510. Thus the stringency of a technology-based particulate standard depends on the level of the NO_x standard concurrently applied. We consider the EPA's actions and the NRDC and industry challenges in turn.[6]

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(1) Designed primarily for purposes of transportation of property or is a derivation of such a vehicle, or

(2) Designed primarily for transportation of persons and has a capacity of more than 12 persons, or

(3) Available with special features enabling off-street or off-highway operation and use.

40 C.F.R. § 86.079-2 (1980). Thus, some light-duty trucks are heavy-duty vehicles, while other light-duty trucks are neither heavy-duty vehicles nor light-duty vehicles within the meaning of the Act. *See* 44 Fed. Reg. 40,784, 40,784-86 (1979).

[4] "Oxides of nitrogen," commonly abbreviated "NO_x," includes nitrogen dioxide, which is also the subject of a National Ambient Air Quality Standard. 40 C.F.R. § 50.11 (1979).

[5] The statutory standard for oxides of nitrogen applies only to light-duty vehicles, *see* Act § 202(b)(1)(B). Therefore the statutory waiver is necessary only for light-duty vehicles, *see* Act § 202(b)(6)(B).

[6] GM raises one final objection relating not to particulate or NO_x standards but to a technique of measuring hydrocarbons. We deal with those contentions briefly in Part IV *infra*.

II. The Particulate Standards

The EPA announced its intention to promulgate standards for particulate emissions from light-duty diesels on February 1, 1979. *See* 44 Fed. Reg. 6650 (1979). The proposed standards would have limited diesel particulates to 0.60 grams per vehicle mile (gpm) in model year 1981, and to 0.20 gpm in model year 1983. The agency concluded that a single standard, governing all light-duty vehicles, was the preferable regulatory strategy, although 1979 certification data indicated that diesel particulate performance among those vehicles ranged from the 0.23 gpm achieved by the Volkswagen Rabbit to the 0.84 gpm emitted by the Oldsmobile 350. *Id.* at 6651. Furthermore, these restrictions would have applied equally to light-duty vehicles and light-duty trucks. *Id.* at 6654-55.

After analyzing the comments elicited by its notice of proposed rulemaking, the EPA promulgated as final standards a modification of the rules originally announced. *See* 45 Fed. Reg. 14,496 (1980). The limit of 0.60 gpm was retained, but its effective date was postponed to model year 1982, because the rulemaking process had absorbed so much time that testing and certification of 1981 models was no longer feasible. *Id.* at 14,497. The agency concluded that the technology necessary to make the 0.20 gpm standard feasible would probably not be developed in time for implementation in 1983 model vehicles; 1984 was a more likely goal, but the effective date was postponed to model year 1985 to give sufficient margin for error. *Id.* at 14,498. Finally, the EPA believed that light-duty trucks would not be able to perform as well as light-duty vehicles, and the 1985 standard for light-duty trucks was therefore adjusted to 0.26 gpm. *Id.* at 14,497.

The auto industry petitioners do not challenge the 1982 standard of 0.60 gpm, but they vigorously deny the likelihood that technology will be available to meet the

lower standards in 1985.[7] In setting the 1985 standards, the EPA predicted that a currently experimental particulate control device, known as a "trap-oxidizer," would be perfected early enough to allow its mass production and installation in 1985 model diesel vehicles. The manufacturers argue that this prediction lacked a sufficient evidentiary basis, and that the agency's action must therefore be invalidated as failing to meet the requirement of reasoned decisionmaking. They also argue that the EPA gave inadequate consideration to the safety risks involved in trap-oxidizer technology.

NRDC insists that the EPA's entire regulatory strategy is an inadequate response to the agency's statutory mandate to protect the public health. The EPA deliberately set a single standard for all light-duty diesel vehicles, predicting that even the worst performing diesel could meet it. NRDC argues that that regulatory choice is inconsistent with the EPA's statutory responsibilities; it urges a variable standard, imposing more rigorous requirements on better performing vehicles. NRDC also urges that the agency failed to consider the risks posed by diesel particulate as a carcinogen, and that in giving

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[7] Originally, GM and Mercedes-Benz also challenged application of the 1982 particulate standard to cars sold in California, asserting that the standard was technologically unachievable in view of California's standards for oxides of nitrogen, which were stricter than the national standard. These challenges raised complex questions concerning the Act's preemption waiver provisions, which allow state standards more protective of health than the federal ones, *see* Act § 209; *Motor & Equipment Manufacturers Ass'n v. EPA*, 627 F.2d 1095 (D.C. Cir. 1979). Subsequently, the California Air Resources Board modified its nitrogen oxides standard, raising the possibility that the manufacturers would be given relief. GM and Mercedes-Benz moved this court to hold in abeyance consideration of the California aspects of their petitions, and this court granted that motion by order on October 20, 1980.

"appropriate consideration" to cost as a factor in standard-setting, it should have tried to discourage purchase of polluting vehicles through economic disincentives. Finally, NRDC attacks the postponement of the 0.20 gpm standard from 1984 to 1985 as unnecessary and irresponsible.

In order to evaluate these claims, we first determine the applicable statutory directives. We then turn to light-duty vehicles and, after discussing the proper standard of review in this case, assess the manufacturers' attack on the EPA's prediction of technological feasibility. Next, we examine the NRDC's claims and, finally, turn to light-duty trucks.

A. *The Source of the EPA's Authority*

Before turning to the merits of the EPA's rulemaking activities, we must consider a threshold question that has attracted attention sporadically throughout the course of the proceedings. Although none of the parties contests the EPA's authority to regulate diesel particulate emissions, there is some disagreement as to the precise statutory provision conferring that authority. GM insists that the EPA's particulate rulemaking for non-heavy-duty vehicles [8] may be viewed only as an exercise of its broad general power to prescribe motor vehicle emission standards under section 202(a)(1) of the Act; [9] the EPA

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[8] The usage is unfortunate, but we must reiterate that no light-duty trucks are light-duty vehicles, and that some light-duty trucks are heavy-duty vehicles, but others are not. *See* note 3 *supra*.

[9] The text of the provision is as follows:

> The Administrator shall by regulation prescribe (and from time to time revise) in accordance with the provisions of this section, standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines, which in his judgment cause, or contribute to, air pollution

argues that an explicit provision of the Act specifically directs it to promulgate particulate standards.

In proposing the challenged regulations, the EPA cited as its statutory basis section 202(a)(3)(A)(iii) of the Act, added by the 1977 Clean Air Act amendments, Pub. L. No. 95-95, § 224, 91 Stat. 685. That provision, set out more fully in the margin,[10] requires that "[t]he Administrator shall prescribe regulations under [section 202(a)(1)] applicable to emissions of particulate matter from classes or categories of vehicles manufactured during and after model year 1981 (or during any earlier model year, if practicable)." GM maintains that this

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which may reasonably be anticipated to endanger public health or welfare. Such standards shall be applicable to such vehicles and engines for their useful life (as determined under subsection (d) of this section, relating to useful life of vehicles for purposes of certification), whether such vehicles and engines are designed as complete systems or incorporate devices to prevent or control such pollution.

Act § 202(a)(1).

[10] The text of the provision is as follows:

The Administrator shall prescribe regulations under paragraph (1) of this subsection applicable to emissions of particulate matter from classes or categories of vehicles manufactured during and after model year 1981 (or during any earlier model year, if practicable). Such regulations shall contain standards which reflect the greatest degree of emission reduction achievable through the application of technology which the Administrator determines will be available for the model year to which such standards apply, giving appropriate consideration to the cost of applying such technology within the period of time available to manufacturers and to noise, energy, and safety factors associated with the application of such technology. Such standards shall be promulgated and shall take effect as expeditiously as practicable, taking into account the period necessary for compliance.

Act § 202(a)(3)(A)(iii).

provision empowers the agency only to set standards for heavy-duty vehicles, while the EPA reads it as applying to any "classes or categories of vehicles," including all light-duty diesels. The apparent meaning of the language of section 202(a)(3)(A)(iii), read in isolation, comports with the EPA's view, but we conclude that that language should not be read in isolation, *see, e.g., Brown v. Duchesne*, 60 U.S. (19 How.) 183, 194 (1857). The structure of section 202 casts doubt on the validity of a literal reading, and after a closer examination of the section's legislative history, we conclude that GM's position is correct.

The EPA's power under section 202(a)(1) antedates the 1977 amendments—such authorization, to the agency and its predecessors, has been present in varying forms since the Clean Air Act Amendments of 1965, Pub. L. No. 89-272, § 101, 79 Stat. 992. The legislative history of the 1970 amendments[11] demonstrates that Congress "expected that section 202(a) authority would be used for regulation of particulate emissions." S. REP. NO. 1196, 91st Cong., 2d Sess. 24 (1970), *reprinted in* 1 LEGISLATIVE HISTORY OF THE CLEAN AIR ACT AMENDMENTS 424 (1974) [hereinafter cited as LEGISLATIVE HISTORY]. Congress did not write in a statutory particulate standard at that time, as it did for vehicular emissions of carbon monoxide, hydrocarbons, and oxides of nitrogen,[12] because of technological obstacles:

> No present measurement techniques exist to evaluate or establish standards for such particulate emissions. Such standards cannot be established on the basis of 1970 vehicles as required by subsection (b) because measurement techniques will not exist until 1972. At such time as measurement methods are developed the Secretary would be expected to estab-

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[11] Pub. L. No. 91-604, 84 Stat. 1676 (1970).

[12] *Id.* § 6 (current version at § 202(b) of the Act).

> lish standards for particulate emissions under 202 (a) authority.

Id.

By 1977, however, Congress had become impatient with the EPA's failure to promulgate a particulate standard.

> The need for a standard for the pollutant particulate matter for motor vehicles was identified in the Senate report in 1970. None has yet been proposed, except for a smoke standard for heavy duty diesels. . . .
>
> EPA should promulgate a standard requiring best available control technology for smoke from heavy duty diesels and other particulate emissions from heavy duty vehicles and motorcycles by model year 1978, if possible, or by model year 1979.

S. REP. NO. 127, 95th Cong., 1st Sess. 67 (1977), *reprinted in* 3 LEGISLATIVE HISTORY 1441. Congress therefore adopted the mandatory language of section 202(a)(3)(A)(iii).

The 1977 Senate report illustrates that congressional concern over vehicular particulate emissions focused on heavy-duty vehicles. They are the major source of the problem; as the EPA observed in the present rulemaking, light-duty "gasoline-powered vehicles with three-way catalysts emit very low levels of particulate." Regulatory Analysis at 31, J.A. 510. Not surprisingly, then, the origin of section 202(a)(3)(A)(iii) can be traced to a provision in the 1977 Senate bill "applicable to emissions of carbon monoxide, hydrocarbons, particulates, and oxides of nitrogen from heavy duty trucks, buses, and motorcycles and engines thereof," S. 252, 95th Cong., 1st Sess. § 19 (1977), *see* S. REP. NO. 127, 95th Cong., 1st Sess. 193 (1977), *reprinted in* 3 LEGISLATIVE HISTORY 1567.[13]

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[13] Section 19 of the Senate bill would have added a paragraph 202(a)(3) providing as follows:

> The regulations under paragraph (1) of this subsection applicable to emissions of carbon monoxide,

The Senate provision was compromised in conference with a less stringent House provision, and the contents of the Senate's bulky paragraph were distributed among subparagraphs of paragraph 202(a)(3)(A) under circumstances suggesting that the omission of the words

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> hydrocarbons, particulates, and oxides of nitrogen from heavy duty trucks, buses, and motorcycles and engines thereof manufactured in model years (A) 1979 and 1980 (and, if appropriate in the judgment of the Administrator, 1978) shall contain standards which require a reduction of emissions of such pollutants established by the application of the best available control technology, taking into account the cost of compliance, as determined by the Administrator, and (B) 1981 and thereafter shall contain standards requiring a reduction of emissions of such pollutants equivalent to the levels required by the standards established under subsection (b) of this section, except that for heavy duty motor vehicles over 10,000 pounds and engines thereof such standards shall constitute a reduction from uncontrolled levels of emissions of carbon monoxide, hydrocarbons, and oxides of nitrogen as actually measured from gasoline powered heavy duty motor vehicles over 10,000 pounds and engines thereof equivalent to the percentage reduction required for light duty motor vehicles in model year 1980 compared to the appropriate model year 1970 base or, for oxides of nitrogen, model year 1971 base (unless the Administrator finds and reports to the Congress that the control technology is not available or has not been available for a sufficient period of time to achieve compliance on any class of heavy duty [ve]hicle or engine thereof and establishes standards which are based on the best available control technology and which constitute a reduction from any standards which apply in model years 1978 through 1980). The Administrator may, where appropriate, divide vehicles and engines thereof regulated under this paragraph into classes by size, weight, horsepower, and use patterns.

This language, as reported by the Senate committee, passed the Senate without amendment. *See* 123 CONG. REC. 18,525 (1977).

"heavy duty" from subparagraph 202(a)(3)(A)(iii) was inadvertent. The section of the act that emerged from conference bore the title, "Emission Standards for Heavy Duty Vehicles or Engines and Certain Other Vehicles or Engines," Pub. L. No. 95-95, § 224, 91 Stat. 685; the substance of that section indicates that the "certain other vehicles" are motorcycles. Subparagraphs 202(a)(3)(A)(i) and 202(a)(3)(A)(ii) still retain the limitation to heavy-duty vehicles. Subparagraph 202(a)(3)(A)(iv), which empowers the Administrator to establish "classes or categories of vehicles or engines for purposes of regulations under this paragraph," is not so restricted, but the conference report is written as if it were: "The Administrator is specifically authorized to subdivide heavy duty vehicles into classes or categories for purposes of this section." H.R. REP. NO. 564, 95th Cong., 1st Sess. 164 (1977), *reprinted in* [1977] U.S. CODE CONG. & AD. NEWS 1502, 1544, 3 LEGISLATIVE HISTORY 544.

This accumulation of detail convinces us that Congress did not intend, in adding section 202(a)(3)(A)(iii), to mandate adoption of particulate standards for light-duty vehicles. Rather, Congress directed the EPA to give priority to establishing particulate emission standards for heavy-duty vehicles, and left the agency free to exercise its power under section 202(a)(1) to regulate light-duty automobiles, whether diesel-powered or otherwise.[14]

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[14] We are aware that the EPA's interpretations of the Clean Air Act on matters open to reasonable differences of opinion are entitled to deference. *See Union Electric Co. v. EPA*, 427 U.S. 246, 256 (1976); *Lead Industries Ass'n v. EPA*, No. 78-2220, slip op. at 29-30 (D.C. Cir. June 27, 1980), *cert. denied*, 101 S. Ct. 621 (1980). In view of our conclusion that the EPA has made all the preliminary findings necessary to invoke its power under section 202(a)(1), however, we do not believe that precise identification of the statutory provision from which the agency's power emanates is so important to the administration of the Act that deference to the EPA's

Our conclusion that the EPA cited the wrong section of the statute [15] as authority for its rulemaking does not necessitate a remand, even though paragraph 202(a)(1) requires, as subparagraph 202(a)(3)(A)(iii) does not, a threshold finding that the regulated pollutant "may be anticipated to endanger public health or welfare." Particulates have long been recognized as one of the major targets of the Clean Air Act. *See, e.g.*, U.S. Dep't of Health, Education, and Welfare, Air Quality Criteria for Particulate Matter (National Air Pollution Control Administration Publication No. AP-49) (1969). And the EPA, in issuing the present regulations, made specific findings on the environmental impact of diesel particulates:

> Section 202(a)(3)(A)(iii) directs EPA to control particulate emissions; it does not require that the Agency first conduct an environmental impact assessment. Nevertheless, EPA has carefully examined the environmental impact of this rulemaking.
>
> . . . .
>
> . . . Small particles, which are much more likely to be deposited in the alveolar region and which require much longer periods of time to be cleared from the respiratory tract, have a greater potential to

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expertise would be appropriate. The agency's reading of section 202(a)(3)(A)(iii), though superficially plausible, is difficult to reconcile with the legislative history and the structure of the statute, and the EPA has made no attempt to do so. Furthermore, we observe that a literal reading of section 202(a)(3)(A)(iii) would require the EPA to promulgate standards governing particulate emissions from light-duty gasoline-powered vehicles, a responsibility that the agency has expressly disclaimed. *See* 45 Fed. Reg. 6650, 6651 (1979).

[15] Of course, to the extent that the class of light-duty trucks includes some trucks that are also heavy-duty vehicles, *see* note 3 *supra*, section 202(a)(3)(A)(iii) does provide the authority for the present rulemaking. *See* Part II(D), *infra*.

> affect human health than larger particles. Thus, control of diesel particulate, of which 100 percent is less than 15 micrometers in diameter and approximately 97 percent of which is less than 2.5 micrometers in diameter, is especially important with respect to human health.

45 Fed. Reg. 14,496, 14,498-99 (1980). Indeed, GM expressly concedes in its brief that "the Administrator considered and discussed the health risks of particulate emissions during rulemaking [and that his] determination that particulate emissions require priority control to protect human health would entitle him to prescribe particulate standards under § 202(a)(1) for light-duty vehicles." Reply Brief for Petitioner General Motors Corp. at 6 [hereinafter GM Brief].[16]

B. *Technological Feasibility*

The EPA's choice of the 0.20 gpm standard for light-duty diesels in 1985 was the result of adjusting current diesel particulate emission data by the percentage of reduction expected from certain technological improvements, most notably the trap-oxidizer. The manufacturers' at-

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[16] Similarly, we do not believe that the EPA's reliance on the mandate of section 202(a)(3)(A)(iii) necessitates a remand to permit the agency to consider exercising its discretion *not* to control light-duty diesel particulate emissions. While disclaiming the need for such findings under the statute, the agency explicitly considered the health impact and the cost effectiveness of the regulations, *see* 45 Fed. Reg. 14,496, 14,498-99 (1980), and even considered other control strategies as alternatives to regulating diesel emissions, *id.* at 14,500. The agency's refusal to regulate particulate emissions from light-duty gasoline-powered vehicles, on the ground that they "are so far below the proposed standard [for diesels] that there is no need to promulgate regulations controlling particulate emissions from those vehicles," 44 Fed. Reg. 6650, 6651 (1979), demonstrates that the EPA did not regard itself as bound with unrealistic rigidity by section 202(a)(3)(A)(iii).

tack on the standard focuses on the EPA's prediction concerning the probable pace of development of trap-oxidizer technology. Before examining the details of the agency's reasoning and the industry challenges, however, we find it useful to discuss the legal standard that governs our inquiry.

1. *The Standard of Review*

The standard of review in this case is the traditional one for judicial scrutiny of agency rulemaking: we are to set aside any action found to be "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." Act § 307(d)(9)(A). As nonscientists, we must recall that "[o]ur 'expertise' is not in setting standards for emission control but in determining if the standards as set are the result of reasoned decisionmaking." *Essex Chemical Corp. v. Ruckelshaus*, 486 F.2d 427, 434 (D.C. Cir. 1973), *cert. denied*, 416 U.S. 969 (1974). Despite this limited role, our examination of the record must be searching, for

> the necessity to review agency decisions, if it is to be more than a meaningless exercise, requires enough steeping in technical matters to determine whether the agency "has exercised a reasoned discretion." . . . We cannot substitute our own judgment for that of the agency, but it is our duty to consider whether "the decision was based on a consideration of the relevant factors and whether there has been a clear error of judgment."

Portland Cement Ass'n v. Ruckelshaus, 486 F.2d 375, 402 (D.C. Cir. 1973), *cert. denied*, 417 U.S. 921 (1974).

In the present case, GM attacks the EPA's estimation of the period of time "necessary to permit the development and application of the requisite technology" to achieve compliance with the 1985 particulate standards, *see* Act § 202(a)(2). The agency has determined that

the technology will be available in time, and now seeks to defend its conclusion as a product of reasoned decision-making. Such predictions inherently involve a greater degree of uncertainty than estimations of the effectiveness of current technology. If we judge the EPA's action by the standard of certainty appropriate to current technology, the agency will be unable to set pollutant levels until the necessary technology is already available.

The legislative history of both the 1970 and the 1977 amendments demonstrates that Congress intended the agency to project future advances in pollution control capability. It was "expected to press for the development and application of improved technology rather than be limited by that which exists today." S. REP. NO. 1196, 91st Cong., 2d Sess. 24 (1970), *reprinted in* 1 LEGISLATIVE HISTORY 424; H.R. REP. NO. 294, 95th Cong., 1st Sess. 273 (1977), *reprinted in* [1977] U.S. CODE CONG & AD. NEWS 1077, 1352, 4 LEGISLATIVE HISTORY 2740. In designing the particulate standard, the EPA recognized the uncertainty necessarily accompanying its duty to predict:

> When projecting a near-term standard when little time exists for technological advances, it is relatively simple for a regulatory agency to predict what the best available control technology will be, and to set a standard based on its application. It is more difficult to regulate on this basis in the long-term because of the uncertainty that inevitably surrounds expected technological improvements. Nevertheless, . . . EPA has concluded that it is absolutely necessary to issue standards which motivate the private sector to maximize its efforts in reducing particulate emissions from light-duty vehicles.

Regulatory Analysis at 32, J.A. 511.

This court has upheld the agency's power to make such projections, while recognizing that it is "subject to the

restraints of reasonableness, and does not open the door to ' "crystal ball" inquiry.' " *International Harvester Co. v. Ruckelshaus*, 478 F.2d 615, 629 (D.C. Cir. 1973). The Clean Air Act requires the EPA to look to the future in setting standards, but the agency must also provide a reasoned explanation of its basis for believing that its projection is reliable. This includes a defense of its methodology for arriving at numerical estimates. *Id.*

The thoroughness and persuasiveness of the explanation we can expect from the agency will, of course, vary with the nature of the prediction undertaken. "Where existing methodology or research in a new area of regulation is deficient, the agency necessarily enjoys broad discretion to attempt to formulate a solution to the best of its ability on the basis of available information." *Industrial Union Dep't v. Hodgson*, 499 F.2d 467, 474 n.18 (D.C. Cir. 1974). At one extreme, this court has recognized that the EPA's decision to regulate potentially harmful pollutants involves a large element of policy choice that cannot be demonstrably "correct," although it must have a genuine scientific basis.

> The Administrator may apply his expertise to draw conclusions from suspected, not completely substantiated, relationships between facts, from trends among facts, from theoretical projections from imperfect data, from probative preliminary data not yet certifiable as "fact," and the like. We believe that a conclusion so drawn—a risk assessment—may, if rational, form the basis for health-related regulations under the "will endanger" language of Section 211.

Ethyl Corp. v. EPA, 541 F.2d 1, 28 (D.C. Cir. 1976) *cert. denied*, 426 U.S. 941 (1976) (footnote omitted); *see Environmental Defense Fund v. EPA*, 598 F.2d 62, 83-85 (D.C. Cir. 1978). We have also acknowledged the necessarily speculative nature of agency predictions in the

social sciences, including judgments of the competitive impact of regulatory decisions. *United States v. FCC*, Nos. 77-1249, *et al.*, slip op. at 59-61 (D.C. Cir. Mar. 7, 1980); *National Small Shipments Traffic Conference v. CAB*, 618 F.2d 819, 829-30 (D.C. Cir. 1980). At the other extreme, this court's inquiry into agency methodology in the physical sciences has been far more exacting "where the facts pertinent to [a] standard's feasibility are available and easily discoverable by conventional technical means." *National Line Ass'n v. EPA*, 627 F.2d 416, 454 (D.C. Cir. 1980).

The present case lies between those two extremes. It does not involve questions at the frontier of physiological knowledge, but it does require a determination by the EPA of the likely sequence of further technological development. There is no known scientific technique for calculating when an as yet unsolved design problem will be ironed out. Thus, unlike the short-term feasibility assessments scrutinized in *National Lime Association*, the present determination presents the court with "the question how much deference is owed a judgment predicated on limited evidence when additional evidence cannot be adduced or adduced in the near future," *id.* at 454.

The time element in the EPA's prediction affects our reviewing task in three distinct ways. First, it introduces uncertainties in the agency's judgment that render that judgment vulnerable to attack. At the same time, however, the time element gives the EPA greater scope for confidence that theoretical solutions will be translated successfully into mechanical realizations, for "the question of availability is partially dependent on 'lead time', the time in which the technology will have to be available." *Portland Cement Ass'n v. Ruckelshaus*, 486 F.2d 375, 391 (D.C. Cir. 1973), *cert. denied*, 417 U.S. 921 (1974). Finally, the presence of substantial lead time for development before manufacturers will have to com-

mit themselves to mass production of a chosen prototype gives the agency greater leeway to modify its standards if the actual future course of technology diverges from expectation.

The relevance of lead time, and of the ability to modify standards in light of future developments, to the degree of justification the agency must offer may be seen in this court's opinion in *International Harvester Co. v. Ruckelshaus*, 478 F.2d 615 (D.C. Cir. 1973). That case, despite numerous dissimilarities to the present one, provides a useful point of reference, and all the parties seek to claim it as their own. In *International Harvester*, the court reversed the EPA's refusal to suspend for one year strict new 1975 model year emission standards that had been set by Congress in the 1970 amendments. This court, reviewing in early 1973 an EPA decision of May 1972, stressed the harm that would result from "a relaxation of standards, and promulgation of an interim standard, at a later hour—after the base hour for 'lead time' has been passed, and the production sequence set in motion." *Id.* at 637. Too late a relaxation would penalize technologically advanced firms, like Ford, which would already have begun manufacture of vehicles that achieved better emission control at the expense of road performance. For this and other reasons,[17] the hardship resulting if a suspension were mistakenly denied outweighed the risks from a suspension needlessly granted. Because of that balance of hardships, the court probed deeply into the

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[17] The court also observed that the National Academy of Sciences had found that little environmental detriment would result from a one-year suspension of the standards. 478 F.2d at 633. And the court added its own conclusion that denial of the suspension might be environmentally "counterproductive," sincere poor road performance of cars complying with the strict 1975 standards could hurt sales of 1975 cars, leaving on the road older cars whose emissions were much higher than the 1974 standards. *Id.* at 634-35.

reliability of the EPA's methodology.[18] The present case is quite different; the "base hour" for commencement of production is relatively distant, and until that time the probable effect of a relaxation of the standard would be to mitigate the consequences of any excessive strictness in the initial rule, not to create new hardships.

The significance of the time factor in *International Harvester* was increased by the fact that the EPA was not predicting future technological advances, but rather was imposing an interpretation on current industry data. That data uniformly indicated that the standards were not being met, yet the EPA claimed that "adjustments" of the data demonstrated the likelihood of compliance. But the court concluded that the agency had failed to demonstrate the reliability of its methodology sufficiently to defend its reinterpretation of apparently adverse data.[19]

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[18] Although at various points in its opinion the court expressed the relationship between the consequences of the agency's action and the requisite showing of reliability in terms of shifting burdens of proof, the court made clear that its close scrutiny of the EPA's methodology was not to be equated with some legal standard of proof.

> We visualize the problem in less structured terms although the underlying considerations, relating to risk of error, are related. . . . The court must seek to discern and reconstruct what the legislature that enacted the statute would have contemplated for the court's action if it could have been able to foresee the precise situation.

478 F.2d at 648 (footnote omitted).

[19] One of the central flaws in the EPA's methodology in *International Harvester* was its procedure for estimating emission levels over the lifetime of the vehicle. Raw data were available from tests conducted at the 4000-mile mark, and the EPA adjusted those figures to take into account deterioration over the next 46,000 miles and improved efficiency of the control devices when leadfree gasoline became available. But the agency had little hard evidence to verify

International Harvester has been cited frequently in cases involving presently-available-technology standards, as well in other cases in which the agency's "central argument is that the standard *is* achievable because it *has* been achieved," *National Lime Association*, 627 F.2d at 432-33 (emphasis in original); *Bunker Hill Co. v. EPA*, 572 F.2d 1286 (9th Cir. 1977); *Duquesne Light Co. v. EPA*, 522 F.2d 1186 (3d Cir. 1975), *vacated*, 427 U.S. 902 (1976); *CPC International, Inc. v. Train*, 515 F.2d 1032 (8th Cir. 1975); *Portland Cement Ass'n v. Ruckelshaus*, 486 F.2d 375 (D.C. Cir. 1973), *cert. denied*, 417 U.S. 921 (1974). The defense of a projection methodology in such cases has required "that variables be accounted for, that the representativeness of test conditions b[e] ascertained, that the validity of tests be assured and the statistical significance of results determined." *National Lime Association*, 627 F.2d at 452-53 (footnotes omitted). But statistically-based techniques for reviewing the methodology of contemporary projections do not translate well into rules for reviewing predictions of future progress. If the agency is to predict more than the results of merely assembling preexisting components, it must have some leeway to deduce results that are not represented by present data.

The EPA has generally been granted "considerable latitude in extrapolating from today's technology" when it predicts future technological developments for the purposes of the Clean Water Act, 33 U.S.C. §§ 1251-1376 (1976 & Supp. II 1978). *See California & Hawaiian Sugar Co. v. EPA*, 553 F.2d 280, 288 (2d Cir. 1977).

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the accuracy of the adjustments, and in one case the "deterioration factor" assumed *improvement* in emission control over the life of the vehicle, despite an independent estimate of deterioration by a factor of 2.5 made by the National Academy of Sciences. 478 F.2d at 646. The court also criticized the EPA's attempt to overcome the absence of GM data by assuming that Ford's control devices would work with equal efficiency in GM vehicles.

The courts have had numerous occasions to review EPA determinations that a given control technique constitutes the "best available technology economically achievable" in the 1980s.[20] Most of the opinions, including our own *American Paper Institute v. Train*, 543 F.2d 328, 352-53 (D.C. Cir. 1976), *cert. dismissed*, 429 U.S. 967 (1976), steer close by the shores of their factual contexts and yield little in the way of explicit doctrine. But their essential requirement is that the agency provide "a reasonable basis for belief that a new technology will be available and economically achievable."[21] *Hooker Chemicals & Plastics Corp. v. Train*, 537 F.2d 620, 635 (2d Cir. 1976). When a technology is already in use in other industries, the court often expects more solid evidence that the technology can be transferred to the industry in question, or at least that relevant dissimilarities have been considered. *American Meat Institute v. EPA*, 526 F.2d 442, 465 (7th Cir. 1975).

To apply these general considerations to our task of review in the present case, we must examine the nature of the EPA's determination. The agency has predicted that the manufacturers will be able to develop a satisfactory version of the trap-oxidizer in the time remaining. This device was designed specifically for the purpose for which EPA intends it, and prototypes have achieved partial success. GM itself has characterized trap-oxidizers as "[t]he most promising particulate

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[20] *See* 33 U.S.C. § 1311(b)(2)(A) (Supp. II 1978). Under current law, the effective dates for these standards vary, up to as late as 1987. 33 U.S.C. § 1311(b)(2)(F) (Supp. II 1978). When the cases cited in the text were decided, the standards were to become effective in 1983. Pub. L. No. 92-500, § 2, 86 Stat. 844 (1972).

[21] The last three words, of course, reflect the statutory language of the Clean Water Act, 33 U.S.C. § 1311(b)(2)(A) (Supp. II 1978), rather than a general principle of judicial review.

traps," and has admitted that "current program status [would] indicate a possibility of 1985 model year production."[22] General Motors Response to EPA Notice of Proposed Rulemaking 132, 175 (1979) [hereinafter GM Response], J.A. 279, 284. The EPA's decision must be judged in terms of record evidence available in early 1980, allowing a "time frame of 2-2½ years for completion of the design development phase [and] 2-2½ years of production lead time."[23] 45 Fed. Reg. 48,133, 48,139 (1980).

Given this time frame, we feel that there is substantial room for deference to the EPA's expertise in projecting the likely course of development. The essential question in this case is the pace of that development, and absent a revolution in the study of industry, defense of such a projection can never possess the inescapable logic of a mathematical deduction. We think that the EPA will have demonstrated the reasonableness of its basis for prediction if it answers any theoretical objections to the trap-oxidizer method, identifies the major steps necessary in refinement of the device, and offers plausible reasons for believing that each of those steps can be completed in the time available. If the agency can make this showing, then we cannot say that its determination was the result of crystal ball inquiry, or that it neglected its duty of reasoned decisionmaking.

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[22] We do not quote this language to suggest that GM is estopped by this statement to the agency. Instead, it is a dramatic illustration of the fact that timing, rather than the ultimate practicability of the trap-oxidizer, is the major source of disagreement in this case.

[23] While the EPA's language suggests a rigorous distinction between production lead time and time available for technological developments, we have held that the agency may take into account the manufacturers' ability to incorporate engineering improvements in the initial portion of production lead time. *International Harvester Co. v. Ruckelshaus*, 478 F.2d 615, 628-29 (D.C. Cir. 1973).

2. *The Time "Necessary to Permit the Development and Application of the Requisite Technology"*

Applying the standard described in the preceding section to the challenged particulate regulations, we can determine whether the EPA has presented an adequate exposition of its reasons for believing that the necessary technology will be available for 1985 model year light-duty diesels to comply with the standard. The EPA bases its prediction that the 1985 standard will be achieved on two factors: modifications decreasing the particulate output of diesel engines,[24] and development of "aftertreatment" technology, that is, means by which the vehicle will remove particulate matter from its own exhaust. The larger proportion of the expected reduction in particulate emissions depends on aftertreatment, and it is the availability of that technology that provokes the major controversy in this case.

The EPA has identified a number of strategies for extracting particulates from diesel exhaust,[25] but the

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[24] In its denial of GM's petition for reconsideration of the particulate standard, the EPA stated that "other measures expected to be taken by 1985, such as engine design modification, derating, turbo-charging and down-sizing are expected to reduce particulate emissions by 15-20 percent in even worst case vehicles." 45 Fed. Reg. 48,133, 48,136 (1980).

[25] The agency also explored the possibility of using continuously operating catalytic converters, or simple replaceable trapping filters. It never ruled out the possibility that these would become feasible alternatives, but it concentrated its discussion on trap-oxidizers, which it expected "to be the preferred aftertreatment technology." 45 Fed. Reg. 14,496, 14,497 (1980). We do not rely on these alternative technologies in upholding the particulate standard. Of course, should catalytic converters prove effective, the manufacturers are free to implement them. An EPA emission standard under the Clean Air Act dictates only the level of emissions permitted, not the technology required for achieving that level.

1985 standard was set in reliance on one preferred method and must stand or fall with the agency's prediction that that method will be available in time. This favored device is the trap-oxidizer, a mechanism that filters out particulates and then periodically incinerates its catch in order to maintain the trapping capacity of the filter.

The trap-oxidizer is essentially a compromise between two other particulate reduction strategies. At one extreme, the vehicle could rely on a mechanical filter alone —but unless that filter were somehow able to maintain its trapping efficiency indefinitely, it would periodically need either replacement or cleaning. At the other extreme, particulates could be continuously incinerated in a catalytic converter—but difficult engineering problems accompany the resulting need to maintain sufficient temperature in the converter (c. 1000° F.) and to keep the particulate matter inside the converter long enough to be burned. Citing the technical barriers to continuous incineration and the behavioral barriers to periodic restoration of a filter by car owners, the EPA recognized the trap-oxidizer as "the preferred method" of particulate control. Regulatory Analysis at 47-50, J.A. 526-29. The trap-oxidizer combines the short-term technical superiority of a filter with the long-term usefulness of a converter.

The EPA has predicted that trap-oxidizers will be available for use in model year 1985 vehicles. As the agency has repeatedly observed, the trap-oxidizer is familiar and unobjectionable as a concept. It is not only theoretically sound—experimental data demonstrate that periodic incineration can maintain efficiency for over 10,000 miles. But to date, no filter material has been found that can withstand periodic incineration of the accumulated particulates throughout the 50,000-mile use-

ful life of the vehicle[26] while maintaining a high level of trapping efficiency. The agency noted that

> the best durability of a trap reported to EPA was a metal mesh trap on an Opel vehicle, run on a modified AMA driving schedule with no hard accelerations, hills, or speeds above 45 mph. The trap survived 12,800 miles and at that time had a collection efficiency similar to its zero-mile efficiency of 55 percent.

Regulatory Analysis at 51, J.A. 530. Understandably, the EPA has concluded that further research is needed before devices with the appropriate characteristics will be available for use:

> Clearly, more basic research still needs to be done in the areas of regeneration initiation and control, and trap durability. Enough progress has been achieved to convince EPA that a successful trap-oxidizer can be developed, but as of this time, no design has proven to have the required collection efficiency over the desired length of time.

Id. at 52, J.A. 531.[27]

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[26] Section 202(d)(1) of the Act sets the useful life of light-duty vehicles and their engines at "five years or fifty thousand miles (or the equivalent), whichever first occurs." In determining compliance with the emission standard, the EPA analyzes the exhaust of vehicles that have accumulated 50,000 miles. *See* 45 Fed. Reg. 14,496, 14,506 (1980). The EPA believes, however, that a trap-oxidizer should last at least 100,000 miles. *See* Regulatory Analysis at 51, J.A. 530, 45 Fed. Reg. 48,133, 48,137 n.36 (1980).

[27] GM seizes upon the EPA's use of the words "basic research" as demonstrating that trap-oxidizer technology is in its scientific infancy. Quoting a definition from a technical dictionary, GM sees this locution as an admission that the industry is engaged in "'[f]undamental theoretical or experimental investigation to advance scientific knowledge, immediate practical application not being a direct objective.'" GM Brief at 22 n.20 (quoting McGraw Hill Dictionary of

Nevertheless, the agency concludes that it is merely a question of time before the trap-oxidizer is perfected. "The improvements that are necessary are engineering problems, and are more a function of the resources allocated to the problem than any scientific or technical breakthrough." 45 Fed. Reg. 14,496, 14,498 (1980). Based on the routine nature of most of the remaining problems, the rapid pace of progress in the field since 1978, and the industry's own forecasts of 1985 as a potential completion date, the agency has determined that the lead time remaining is sufficient for application of the requisite technology.

GM dismisses the agency's conclusion as baseless speculation and charges the EPA with naive optimism about the solution of myriad uncertainties, ranging from the development of a durable filter material to the proper location of the trap on the vehicle itself, *see* GM Brief at 28. GM regards the gaps in present knowledge as vitiating the entire standard-setting endeavor:

> Until further experimental knowledge on these major development needs is obtained, it is totally impossible to specify when a successful system will be developed for passenger cars and light-duty trucks. Thus, any particulate standard which contemplates use of a regenerative trap-oxidizer must be judged premature and not technologically feasible.

GM Petition for Reconsideration of Standard at 8 [hereinafter GM Petition] J.A. 812. Thus, GM believes that

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SCIENTIFIC AND TECHNICAL TERMS 142 (1st ed. 1974)). The definition continues, "[a]lso known as pure research." *Id.* It is obvious from the context that the EPA did not intend to characterize trap-oxidizer research as an exploration on the frontiers of pure science. Success requires further work on the individual components of the system, with their practical applications borne constantly in mind.

no standard can be promulgated, regardless of its effective date, on the current record.

Before analyzing GM's technical objections, we must reiterate the standard of review that governs this case. The EPA is not obliged to provide detailed solutions to every engineering problem posed in the perfection of the trap-oxidizer. In the absence of theoretical objections to the technology, the agency need only identify the major steps necessary for development of the device, and give plausible reasons for its belief that the industry will be able to solve those problems in the time remaining. The EPA is not required to rebut all speculation that unspecified factors may hinder "real world" emission control.

The EPA has identified as the necessary remaining steps in development of trap-oxidizer technology the choice of a durable, efficient filter material, the selection of an incineration method, and the refinement of a control mechanism to bring about automatic initiation of the regeneration process. GM agrees with the agency's specification of these aspects of the trap-oxidizer as the ones requiring further research. GM Brief at 22 ("Three critical issues concerning trap oxidizer feasibility remain unresolved: trap durability, regeneration, and collection efficiency.").

a. *Development of a Durable Filter*

The most vigorously controverted issue in this case concerns durability, which the EPA has recognized as the key remaining problem. "Collection efficiencies and regeneration techniques have progressed to the point where the most critical issue is whether the efficiency and regeneration mechanism can be maintained over the useful life of the vehicle." 45 Fed. Reg. 14,496, 14,498 (1980). Both parties focus on the GM Opel test, in

which a metal mesh trap survived over 12,000 miles; the EPA views this test as a stirring demonstration of how far research had progressed in the brief springtime of trap-oxidizer research, while GM sees the 12,000-mile mark as insubstantial compared to the 50,000- to 100,000-mile goal.

The EPA has predicted that the necessary work can be accomplished in time for 1985 model year production. The agency points to the wide variety of materials that have demonstrated appropriate initial efficiencies; several of these are hybrids,[28] suggesting that new combinations of present candidates, rather than hitherto untested substances, may provide the answer. The EPA noted the rapid pace of achievement since attention turned to trap-oxidizers:

> Considerable progress has occurred in the last 1½ years. Initial aftertreatment research concentrated on the use of simple traps and gasoline engine catalytic converters, with basic problems of efficiency and backpressure. In the last 1½ years we have seen marked improvements in efficiency and backpressure, and more importantly, a general consensus that the trap-oxidizer can periodically (and possibly even continually) incinerate the particulate matter. Methods for regeneration initiation and control have been investigated and repetitive incineration has been demonstrated for several trap-oxidizers.

45 Fed. Reg. 14,496, 14,498 (1980). The small number of successful tests reflected the recent focus on trap-

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[28] For example, the EPA cited almuina-coated metal mesh used by the manufacturers, and an alumina-coated steel wool trap that it had tested, in the announcement of the final rules. 45 Fed. Reg. 14,496, 14,497 (1980). GM has also experimented with ceramic-coated metal mesh. GM Response at 85, J.A. 237.

oxidizers, not a persistent record of failure: "At this time, EPA has limited trap-oxidizer durability data, as researchers have been reluctant to fund durability testing until other, more basic questions were solved." *Id.*[29] Finally, the manufacturers themselves had projected the possibility of introducing trap-oxidizers in 1985 models. *See* Summary and Analysis of Comments on the Notice of Proposed Rulemaking at 40-41 (1979) [hereinafter cited as Analysis of Comments], J.A. 358-59. The agency fully recognized that no durable, efficient filter material was presently available, but concluded that, based on current progress and past achievements, there were sufficient grounds for believing that one would be developed in time for the 1985 standard.

We conclude that these are plausible reasons for a determination that the industry is capable of solving the durability problem in the allotted time. The EPA could reasonably refuse to be discouraged by the limited initial success, as the project is relatively young. The rapidity of recent progress is a factor that the agency may consider in making a prediction of future capabilities. *See Society of the Plastics Industry, Inc. v. OSHA*, 509 F.2d 1301, 1309 (2d Cir. 1975), *cert. denied*, 421 U.S. 992 (1975). And the industry's own predictions, while not determina-

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[29] The EPA also argued that setting a future standard on the basis of current predictions was necessary to encourage manufacturers to commit resources to the appropriate technology, as demonstrated by "the stated needs of GM and other diesel manufacturers regarding lead time and specific goals to be achieved through their development efforts." 45 Fed. Reg. 48,133, 48,138 (1980). The agency also observed that, in its application for a NO_x waiver, "GM indicated that a major constraint on its ability to focus on development of the requisite technology to meet a 1.0 gpm NO_x standard was that it did not know what the [other] standards were to be," specifically citing the particulate standard. *Id.* at 48,139.

tive, support the view that success in this kind of research can realistically be expected within the proposed time frame. We conclude that the EPA's durability prediction, though uncertain, is no more uncertain than such estimates inherently must be, and that the EPA has met the requirement of "reasoned decisionmaking."

b. *Efficiency*

We agree with GM's assertion that the very concept of efficiency "is virtually meaningless in the absence of acceptable durability and regenerative capacity." GM Reply Brief at 17. Rather than viewing efficiency as an independent factor that the EPA has failed to analyze adequately, we believe that the efficiency question must be seen as an aspect of the durability problem just considered. The variety of filter elements with sufficient initial efficiency is apparent from the record, and played an important role in the agency's prediction that a filter combining both durability and efficiency would be developed in the next few years.

We also observe, however, that efficiency differs from durability and regenerability in that the EPA's ability to make minor adjustments to the efficiency factor affords a safety valve for the standard. If a durable, regenerable trap-oxidizer is developed, but is found only to achieve an average efficiency of fifty-five percent, then most diesels will be in compliance with the standard, and only a small reduction in its stringency would be necessary to permit even the worst polluters to comply. If the research falls short on durability or regenerability, in contrast, the standard would have to be radically changed for all but the smallest diesels.

We find no fatal defect in the EPA's prediction that a trap-oxidizer with the requisite efficiency will be developed, given our resolution of the durability issue.

c. *Regeneration Initiation and Control*

The EPA has pointed to two viable means of incinerating accumulated particulates: throttling, which increases the heat of the engine exhaust itself by reducing air intake, and ignition from a separate heating element. Regulatory Analysis at 50, J.A. 529. In either case, use of a noble metal catalyst facilitates burning at lower temperatures, lessening the additional increment of heating required. *Id.* For systems relying on an independent heat element, dividing the trap into two chambers permits a further reduction in the amount of power required. *Id.* Throttling has been demonstrated as an effective method for incinerating particulates, and the EPA saw most promise in a system relying on throttling and a catalyst, plus insulation of the exhaust system to reduce heat loss. *Id.* at 51, J.A. 530. GM achieved good results with throttling alone, at least at speeds over thirty-five mph. GM Response at 110-13, J.A. 262-65.

GM complains of the excessive electric demand created by a heating element; as the EPA observed, that demand is considerably reduced by using a dual path trap, insulating the exhaust system, and introducing a noble metal catalyst. Regulatory Analysis at 50, J.A. 529. GM next seeks to characterize air intake throttling as unsafe and unreliable, despite the success of GM's own tests. GM emphasizes the failures in an EPA test conducted in 1979: the EPA investigators created temperatures in excess of 1100° F., and eventually discovered that they had blown a hole through their trap. J.A. 729-35. This anecdote does not demonstrate that proper control of the throttling process is unfeasible, particularly if a catalyst is used to lower the necessary temperature.

For both throttling and ignition approaches, some automatic method of initiating incineration is required.

A simple mechanical device tied to the odometer is conceivable, but more subtle control can be achieved with microelectronics.

GM insists that the agency has no basis for believing that a control mechanism for initiating and regulating the incineration process can be developed. This argument is without merit. GM's own prototype throttling vehicle "utilize[d] a microprocessor controller to set the position of the throttle in the air intake as a function of engine speed and rack angle." GM Response at 110, J.A. 262. GM states no theoretical objection to automated control of the incineration process and does not deny that the necessary computer technology exists. GM merely points to the EPA's admission that "[i]t is impossible at this time to delineate the exact design" of the control unit, Regulatory Analysis at 51, J.A. 530, and insists that "the relevant parameters cannot be delineated unless and until *a final design is selected.*" GM Reply Brief at 17 (emphasis in original). Nothing in the record suggests that adaptation of preexisting computer technology to the specific design of a GM trap-oxidizer will be anything other than routine, *see* Denial of Petition for Reconsideration, 45 Fed. Reg. 48,133, 48,137 (1980), and the EPA is not obliged to establish that no unknown parameters will later prove relevant to proper control.[30]

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[30] We similarly reject GM's argument that the EPA failed to consider the question of *where* the trap-oxidizer would be placed under the automobile. None of the drawbacks GM sees in various positions raises insuperable barriers to the trap-oxidizer system, and we agree with the EPA that location and configuration are problems for individual manufacturers to deal with at the appropriate time. *See* 45 Fed. Reg. 48,133, 48,137 (1980).

d. *Conclusion*

In summary, we find sufficient support for the EPA's necessarily predictive judgment and therefore uphold the EPA's particulate standard. The agency has given the manufacturers substantial lead time, and there is room for interim adjustments to the standard without significant hardship. Under those circumstances, the applicable standard of review allows the EPA considerable latitude to exercise its expertise through reasoned projections. We find that the agency has given an adequate explanation of its reasons for believing that the necessary steps in improving trap-oxidizer technology can be completed in the time remaining.[31]

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[31] GM also makes a health-related argument, claiming that the EPA failed to give adequate consideration to safety factors in relying on trap-oxidizers. This complaint is based on the wording of section 202(a)(3)(A)(iii), which requires the EPA to give "appropriate consideration to . . . safety factors associated with the application of such technology," but we believe that safety considerations are equally relevant in evaluating the technological feasibility of standards promulgated under section 202(a)(1). GM's argument is essentially that, in its current state of development, the trap-oxidizer is not safe because the incineration of particulate sometimes gets out of hand, posing a possible danger to the rest of the car. GM insists that its pessimism about its ability to cure this problem should preclude the EPA from imposing particulate standards that assume the use of a trap-oxidizer. We fully approve the EPA's response to this claim:

> EPA would not require a particulate control technology that was known to involve serious safety problems. If during the development of the trap-oxidizer safety problems are discovered, EPA would reconsider the control requirements implemented by this rulemaking.

45 Fed. Reg. 14,496, 14,503 (1980). GM has not presented any theoretical reason why trap-oxidizers cannot be made safe, and it would be premature to rule them out at present.

C. *NRDC's Objections to the Particulate Standards*

The NRDC, in contrast to GM, thinks that the EPA's standards for diesel particulates are too lax, and attacks a number of the decisions in their regulatory genesis. We find no merit in the NRDC's objections.

The NRDC's first attack is on the regulatory date, relying on the EPA's suggestion that "there is a strong likelihood that trap-oxidizers will be feasible for vehicle application by 1984," Regulatory Analysis at 53, J.A. 532. In view of the uncertainty remaining as to whether even the 1985 date is realistic, we defer to the EPA's determination that a 1984 date would leave too little margin for error.

The second objection is to the EPA's consideration of cost in standard setting. The NRDC notes the EPA's estimate that "[e]ven with the particulate regulations, the overall cost of pollution control from diesels should be less than that from gasoline engines." *Id.* at 120-22, J.A. 599-601. The NRDC argues that the carcinogenic character of diesel particulates makes diesel vehicles so dangerous that "appropriate consideration" to cost would require the EPA to discourage purchase of diesels by making them more expensive. Emission standards should be tightened until the cost of compliance by diesels exceeds the cost of compliance by gasoline vehicles. But the correlation between scientific achievement and research investment is not so mechanical that the EPA could set a dollar figure and then compute the level of emission control it would buy. The agency has projected the probable course of future advances in particulate reduction to the best of its ability, assuming a reasonable range of research investment. The statute requires no more.

The NRDC also charges that the EPA "ignored" the risk of cancer posed by particulates. Even a glance at the record refutes the suggestion that the EPA was *un-*

aware of the risk, or irresponsibly discounted it.[32] A more temperate rephrasing of this claim is that the regulatory approach would have been stricter if the EPA had focused more strongly on the carcinogenic potential of diesel emissions. In this form, the claim becomes another facet of the NRDC's attack on the choice of worst-performing diesel as the measure of technological feasibility.

Although we have held that the proper statutory basis of the EPA's power to issue particulate standards for

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[32] A typical example is the following passage from the commentary accompanying the final rules:

> Small particles, which are more likely to be deposited in the alveolar region and which require much longer periods of time to be cleared from the respiratory tract, have a greater potential to affect human health than larger particles. Thus, control of diesel particulate, of which 100 percent is less than 15 micrometers and approximately 97 percent of which is less than 2.5 micrometers in diameter, is especially important with respect to human health. There is also particular concern over the chemical composition of diesel particulate emissions, as the extractable organic fraction of diesel particulate has been shown to be mutagenic in short-term bioassays, and EPA is currently performing a health assessment to determine the carcinogenic risk (if any) to human health. EPA believes that this uncertainty is another factor which necessitates priority control of diesel particulate emissions.

45 Fed. Reg. 14,496, 14,499 (1980). Furthermore, in the initial grant of NO_x waivers that preceded the promulgation of the final particulate standards, the EPA stated its belief that

> [t]he likelihood of serious harm from an increase in diesel particulates accompanying waiver denial is more substantial than the potential harm from delaying a decrease in NO_x emissions due to the uncertainty surrounding current evidence suggesting a risk of human cancer from diesel exhaust, as well as the presence of known carcinogens in diesel exhaust.

45 Fed. Reg. 5480, 5492 (1980).

light-duty vehicles is the general authority of section 202(a)(1), *see* Part II(A) *supra*, the EPA viewed itself as bound by the explicit mandate of section 202(a)(3)(A)(iii) to require "the greatest degree of emission reduction achievable." *See* Regulatory Analysis at 31, J.A. 510. Both provisions call for a determination that the technology needed for compliance will be available when the standards take effect. Assuming arguendo that appropriate consideration of the carcinogenic potential of diesel particulates would have required standards reflecting the greatest degree of reduction achievable, we turn to the NRDC's claim that the worst-performing-diesel standard does not comply with the directive of section 202(a)(3)(A)(iii).

The EPA defends its decision to promulgate a single particulate standard applicable to all light-duty diesel vehicles, rather than a number of standards applicable to various classes of diesels. One reason given is the absence of any apparent parameter on which to base such a classification.[33] Another concern is the paradoxical result that graduated standards, by imposing stricter and more costly requirements on low-polluting vehicles, would skew competition in favor of the more loosely regulated, highly polluting models. Finally, Congress itself has taught this method by example, providing unitary emission standards for all passenger vehicles in both the 1970 and 1977 amendments. We conclude that the adoption of a single particulate standard for light-duty diesel vehicles was within the EPA's regulatory discretion.

Even if a single standard is proper, the NRDC asserts, it ought not to be one that *every* diesel can meet. The NRDC cites a favorable passage in *International*

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[33] For example, certification data and best reported test data confirm that neither engine size nor vehicle weight correlates consistently with the level of particulate emissions. *See* Regulatory Analysis, Tables IV-2 and IV-3, J.A. 516, 518.

Harvester, in which this court agreed with the Administrator that the Act's technological feasibility provisions required only that the standards permit basic auto demand to be met, "even though this might occasion fewer models and a more limited choice of engine types." 478 F.2d at 640. In this case, however, the EPA viewed the legislative history of the 1977 amendments as justifying a more tolerant attitude toward diesel development in the near future. *See* text at note 36 *infra*. The availability of waivers of the 1.0 gpm oxides of nitrogen standard for "*any* class or category" of diesel vehicles that requires them, Act § 202(b)(6)(B) (emphasis added), certainly suggests an interest in exploring the full range of potential benefits of diesel technology. We do not hold that the statute mandates such an approach, but it was well within the EPA's regulatory discretion to impose "standards which provide significant particulate reductions, but which do not force any diesel models out of production." Regulatory Analysis at 32, J.A. 511.

D. *Light-Duty Trucks*

As we have had occasion to observe, some light-duty trucks come within the "heavy-duty vehicle" category for which particulate emissions stardards are authorized by section 202(a)(3)(A)(iii), while others remain in a residual category, neither heavy-duty vehicles nor light-duty vehicles, governed by section 202(a)(1). *See* note 3 *supra*. This distinction does not affect our analysis of the present challenges to the particulate standard for light-duty trucks, however, because petitioners' objections are too general to implicate the varying nuances of the separate statutory provisions. NRDC essentially repeats its claims against the light-duty vehicle standard, while GM's attack focuses on the adequacy of the support in the record.

The EPA originally proposed the same particulate standards for light-duty trucks and light-duty vehicles,

for both 1981 and 1983, *see* 44 Fed. Reg. 6650 (1979). The agency subsequently explained this proposal as reflecting the frequent congruity between light-duty truck and light-duty vehicle emission control:

> It has been established in previous EPA rulemakings that manufacturers usually apply passenger car emission control technologies to light-duty trucks in order to comply with similar standards, since the engine configurations and type of use are very similar. For instance, GM's diesel light-duty trucks utilize the same diesel engines that are used in the GM 4,500 pound light-duty vehicles.

45 Fed. Reg. 48,133, 48,138 (1980) (footnotes omitted). The meager relevant data submitted in comments on the proposed rulemaking, however, suggested that light-duty trucks emit substantially more particulates than do passenger vehicles. *See* Regulatory Analysis at 53-58, J.A. 532-37.

The EPA analyzed these data, and concluded that the "higher inertia weight and aerodynamic drag" of light-duty trucks would necessarily result in higher particulate levels. 45 Fed. Reg. 14,496, 14,497 (1980). The higher road load horsepower of the trucks also contributed to greater emission levels. *See* 45 Fed. Reg. 48,133, 48,138 (1980); Regulatory Analysis at 54-55, J.A. 533-34. Furthermore, the expected improvements in light-duty vehicle emissions due to downsizing of vehicles and their engines would not be equalled by light-duty trucks. Regulatory Analysis at 58, J.A. 537. Finally, the increasing stringency over the next decade of the oxides of nitrogen standard for light-duty trucks would exacerbate particulate emissions.[34] *Id.* at 57, J.A. 536. Taking into account all these factors, the EPA concluded that the particulate emissions from light-duty trucks, before after-

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[34] This result is due to the trade-off between particulate control and NO_x control caused by exhaust gas regeneration technology, as discussed in the text preceding note 6 *supra*.

treatment, would be thirty percent greater than those from light-duty vehicles. Therefore, the appropriate particulate standard, after trap-oxidizer treatment, would be 0.26 gpm rather than 0.20 gpm. 45 Fed. Reg. 14,496, 14,497 (1980).

The EPA's adjustments to the particulate standard were based on actual industry data, not theoretical projections of the effect of the measured factors on particulate emissions. GM offers an alternative explanation of the empirical observations, claiming that truck exhaust flow is increased by the different operating conditions of truck-type service, and faults the EPA for not including GM's hypothesized factor in its analysis. GM presents no data suggesting that inclusion of this additional factor would have resulted in a different extrapolation from the current observed emissions, and presented none at the time of its petition to the agency for reconsideration, *see* GM Petition, J.A. 805-16. We perceive no justification in GM's conclusory allegations for condemning as unreasoned the EPA's attempt to determine the relevant differences between light-duty trucks and passenger vehicles.

GM also attacks as unduly speculative the agency's assumption that trap-oxidizer technology developed for light-duty vehicles can be applied to light-duty trucks with only minor adaptations. Again, GM offers no specific reason for believing that particulate emission control devices will be any less suitable for light-duty trucks than previous emission control devices have been. GM's own pessimistic speculations cannot be conclusively refuted until the trap-oxidizer is completed, but as we have stated before, the mere possibility that unforeseen complications will develop does not render a prediction unreasonable.[35]

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[35] For light-duty trucks bulky enough for membership in the heavy-duty vehicle category, it is worth observing that

yet another factor distinguishes the present case from *International Harvester*. In that case, the court's perception of the economic unfairness to Ford, the technological leader, was magnified by the absence of any method for preventing GM from capitalizing on the greater consumer attractiveness of its dirtier cars:

> One could imagine some form of regulation through interim standards, whereby the laggard could be deprived of an expected windfall, through requiring some percentage of his vehicles to meet a standard which can only be met by the leader; but this form of economic regulation does not seem contemplated by Congress and would be subject to innumerable regulatory problems. Congressional indemnities might present a possibility. Obviously neither possibility could reasonably be taken into account as a basis for decision.

478 F.2d at 638 n.79. Citing *International Harvester*, Congress enacted such a scheme of "nonconformance penalties" for heavy-duty vehicles in section 224 of the 1977 Clean Air Act Amendments, Pub. L. No. 95-95, 91 Stat. 685 (codified at 42 U.S.C. § 7525(g) (Supp. I 1977)):

> [I]n order to assure achievement of the maximum emission reduction which is reasonably projected to be available, while at the same time not ruling the "laggard" out of the market, the Committee provided for further flexibility in this section—i.e., permission for certain nonconforming vehicles or engines to be certified conditional upon payment of a nonconforming technology penalty.
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> . . . .
>
> . . . [T]he formula must be such as will reflect the degree of the nonconformity, create incentives for compliance with the revised standards, and prevent any competitive disadvantage for manufacturers which do meet revised standards.

H.R. REP. No. 294, 95th Cong., 1st Sess. 275-76 (1977), *reprinted in* [1977] U.S. CODE CONG. & AD. NEWS 1354-55, 4 LEGISLATIVE HISTORY 2742-43. In the particulate rulemaking, the EPA declined to formulate a scheme of nonconformance penalties at present, in view of its "project[ion] that all members of the light-duty truck industry will be capable of complying with these standards." 45 Fed. Reg. 14,496, 14,501 (1980).

Finally, NRDC's challenge to the particulate standard for light-duty trucks is more candidly a variation on its objections to the light-duty vehicle standard. NRDC denies that a standard based on the worst performing diesel can accomplish the "greatest degree of emission reduction achievable" within the meaning of section 202 (a)(3)(A)(iii). We have already upheld the worst-performing-diesel standard for light-duty vehicles as within the EPA's regulatory discretion, and we find that the similar standard for light-duty trucks is equally so.

III. The Oxides of Nitrogen Waivers

The NRDC also challenges the EPA's granting of waivers of the standards for oxides of nitrogen (NO_x) to various manufacturers. The NRDC argues that the EPA did not properly interpret or apply the statutory prerequisites that must be satisfied before such waivers may be granted. We uphold the EPA's decisions.

The NO_x waivers at issue are temporary relaxations of the statutory NO_x standard of 1.0 gpm for individual light-duty diesel vehicle models that are unable to achieve that standard. The EPA granted waivers permitting emissions up to 1.5 gpm for the 1981 and 1982 model years for certain GM, Daimler-Benz, Volvo, and Peugeot models, and waivers at levels varying from 1.3 to 1.5 gpm for certain Volkswagen diesels. 45 Fed. Reg. 5480 (1980); 45 Fed. Reg. 34,719 (1980). The EPA's basic rationale in granting the waivers was that looser NO_x standards were necessary to permit compliance with the new particulate standards.

The waiver provisions of the Clean Air Act Amendments of 1977 reflect Congress' concern that pollution control standards tailored to the virtues and vices of the traditional gasoline engine might stifle the development of

innovative alternative technologies. Newer systems that could evenutally offer distinct advantages might require a period of indulgence before demonstrating their full potential. This concern focused particularly on oxides of nitrogen, which were known to present a serious challenge for the diesel engine. *See, e.g.*, H.R. REP. NO. 294, 95th Cong., 1st Sess. 249-50 (1977); 123 CONG. REC. 16,924 (1977) (remarks of Rep. Dingell); 123 CONG. REC. 18,184 (1977) (remarks of Sen. Baker).

The present NO_x waiver provision for diesels, section 202(b)(6)(B) of the Act, emerged in conference, splitting a separate diesel waiver off from the general waiver for an "innovative power train technology or innovative emission control device or system."[36] The duration of the waiver was limited to a maximum of four years, and a list of prerequisites to granting the waiver was added:

> Such waiver may be granted if the Administrator determines—
>
> (i) that such waiver will not endanger public health,
>
> (ii) that such waiver will result in significant fuel savings at least equal to the fuel economy standard applicable in each year under the Energy Policy and Conservation Act, and
>
> (iii) that the technology has a potential for long-term air quality benefit and has the potential to meet or exceed the average fuel economy standard applicable under the Energy Policy and Conservation Act at the expiration of the waiver.

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[36] *Compare* Act §§ 202(b)(6)(A), 202(b)(6)(B) *with* H.R. 6161, 95th Cong., 1st Sess. § 23, 123 CONG. REC. 18,525 (1977), *reprinted in* 3 LEGISLATIVE HISTORY 1171-72 (Senate version), *and* H.R. 6161, 95th Cong., 1st Sess. § 203(c) (1977) (House version).

Act § 202(b)(6)(B). The House bill had contained a similar public health requirement,[37] but the "air quality benefit" criterion was wholly new.

In its guidelines for waiver applications, the EPA set out its interpretation of these criteria, and listed in detail the information that manufacturers would have to submit in order to meet their burden of demonstrating that waivers should be granted. 43 Fed. Reg. 30341 (1978). The January 1980 announcement of waivers for GM, Daimler-Benz, and Volvo was accompanied by a rejection of Peugeot and Volkswagen applications due to insufficiency of information,[38] after more data were submitted, those waivers were granted in May 1980. 45 Fed. Reg. 5480 (1980); 45 Fed. Reg. 34,719 (1980). Although all manufacturers had requested four-year waivers, the EPA concluded that the data only justified waivers for 1981 and 1982.

The NRDC argues that these waivers should never have been granted because diesel technology cannot meet two of the statutory criteria for the waiver: the public health standard and the air quality benefit standard. The NRDC does not dispute the EPA's findings that waivers are *necessary* for certain vehicles. Before scru-

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[37] The public health requirement was added by the Dingell-Broyhill amendments, which greatly liberalized the waiver provisions. *See* 123 CONG. REC. 16,918 (1977). The House committee bill contained a waiver for a limited class of diesels without a public health prerequisite, *see* H.R. REP. No. 294, 95th Cong., 1st Sess. 413-14 (1977) *reprinted in* 4 LEGISLATIVE HISTORY 2880-81. The Senate committee bill had no innovative technology waiver at all; this provision was added on the Senate floor by the amendments of Sen. Baker. *see* 123 CONG. REC. 18,183 (1977). Thus the committee reports shed little light on the final prerequisites for waiver.

[38] Waivers were also denied for certain GM, Daimler-Benz, and Volvo models for the same reason. 45 Fed. Reg. 5480, 5487 (1980).

tinizing these claims, it is important to note our agreement with a position that the EPA has emphasized throughout these proceedings. The NO_x waiver process was not intended as an opportunity to decide the ultimate fate of diesel technology. It was meant to offer temporary encouragement to further development of diesels, so long as the public interest would not be unduly endangered. There will be other opportunities to evaluate the costs and benefits of that technology as more becomes known about it. In announcing the NO_x waivers, the EPA repeatedly stressed that "this decision does not represent an open door to future production of light-duty diesels without great emphasis on developing methods to identify, characterize and control diesel-related emissions." And the agency cautioned manufacturers "to proceed with the full realization that EPA has authority to act in the future under other provisions of the Act to prevent diesel emissions from posing an unacceptable risk to public health." [39] 45 Fed. Reg. 5480, 5492-93 (1980).

A. *The Waiver "Will Not Endanger Public Health"*

The public health criterion for the NO_x waivers does not require an evaluation of the long-term public health impact of diesel technology. It requires a finding "that such *waiver* will not endanger public health." Act § 202 (b)(6)(B)(i) (emphasis added). A major focus is thus on the character of emissions during the period of the

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[39] The EPA pointed to its duty under § 202(a)(4) of the Act to prohibit engine systems that "cause or contribute to an unreasonable risk to public health, welfare, or safety." *See* H.R. REP. No. 294, 95th Cong., 1st Sess. 278 (1977) *reprinted in* [1977] U.S. CODE CONG. & AD. NEWS 1077, 1357, 4 LEGISLATIVE HISTORY 2745 (summarizing reports of increased emissions from diesel and other engines, and concluding that "a technological assessment of various technologies should be undertaken as part of the basic new motor vehicle certification procedure").

waiver. Furthermore, the EPA found it likely that diesel vehicles could be marketed even if no NO_x waivers were granted. Given the industry's commitment of resources to diesel production, the EPA believed that the original NO_x standard might be met using exhaust gas recirculation, which reduces NO_x but aggravates other polluting characteristics of diesel engines.

The EPA rejected the NRDC's claim that NO_x waivers would endanger the public health because of increased NO_x emissions. After analyzing the relevant data, the agency concluded that diesel NO_x waivers would slow the expected decreases in ambient NO_x levels over the next decade, but that this impact "would not be significant." 45 Fed. Reg. 5480, 5488-89 (1980). We agree that Congress did not intend to preclude NO_x waivers merely upon a showing that *some* impact on NO_x levels would result. We cannot agree with the NRDC's contention that the EPA's determination that the effect was de minimis was "clearly erroneous," Brief for Petitioner NRDC at 59 n.93 [hereinafter cited as NRDC Brief].

The EPA's public health evaluation also addressed the effect of the NO_x waivers on emissions of other pollutants. This factor weighed *in favor of* granting the waivers because the technology used for NO_x reduction increases emissions of several other harmful substances. 45 Fed. Reg. 5480, 5489 (1980). Particulates were an object of special concern, since greatly increased particulate emissions are a major distinguishing feature of diesel vehicles.

The EPA concluded that, given current technology, there was necessarily a trade-off between NO_x emissions and particulate emissions. The NRDC opposed this view, but its arguments before the agency failed to take into account the fact that particulate standards under section 202(a) must be "technology-based." It therefore insisted that the NO_x waivers would increase particulate emis-

sions by increasing sales of diesel vehicles. "For any given particulate standard, relaxing the NO_x standard would lower the cost of producing diesel-powered cars." NRDC Comments on NO_x Waiver Applications at 7 (1979), J.A. 1067. This assertion overlooks the fact that no "given particulate standard" can be assumed until the NO_x level has been determined, for as we have recognized above, the applicable standards for other pollutants help determine the particulate levels that available technology can achieve. In setting the 0.6 gpm particulate standard for 1982-1984, the EPA repeatedly observed that it was assuming a 1.5 gpm NO_x standard. Regulatory Analysis at 33, J.A. 512; 45 Fed. Reg. 14,496, 14,497 (1980).

It was perfectly proper for the EPA to bear in mind this trade-off in evaluating the public health impact of the NO_x waivers. The NRDC itself has stressed the respiratory and carcinogenic dangers of particulates, and we cannot say that the EPA was arbitrary in concluding that the benefits of reducing particulate levels outweighed the dangers of slightly increased NO_x levels.

On appeal, the NRDC makes a somewhat different argument—that even if the particulate level will be raised by denial of the NO_x waiver, the total particulate emissions nationwide from the fleet of diesel vehicles would still be less than if waivers had been granted. NRDC estimates that the marginal cost of achieving the 1.0 gpm NO_x standard would increase the price of diesels, and thereby lower the demand for them, to so great an extent that the total fleet emissions of particulate would be decreased by denial of the waiver, even though *individual* vehicle particulate emissions would be greater. NRDC Brief at 61. NRDC claims that if the EPA had properly calculated this effect of the waiver decision it would have concluded that the public health requires that the waiver be denied. But, as the EPA's brief ob-

serves, the NRDC has never offered factual support for this contention. Brief for Respondent EPA at 119 n.111. Certainly the record does not compel NRDC's conclusion. Data submitted by the manufacturers, though not adjusted for this marginal cost argument, indicated substantial increases in total particulate levels if the waivers were denied.[40] We cannot say that the cost of an exhaust gas recirculation system would necessarily dampen diesel demand enough to reverse this trend.

B. *The Technology "Has a Potential for Long-Term Air Quality Benefit"*

The meaning of the "long-term air quality benefit" criterion is less self-evident than that of the public health requirement. This prerequisite to the diesel waivers was contained in neither the House nor the Senate bill, but emerged in conference. The sole elaboration of its content is found in an explanation of the conference's efforts made to the Senate by the bill's sponsor, Senator Muskie:

> And finally, in order to assure that the waiver will be targeted towards long term air quality benefits, the waivers may only be granted if there is a substantial likelihood that the engines will be able to comply at the end of the waiver period with the statutory emissions standards. Thus the waiver is not intended to provide a loophole in the statutory standards, but only to provide an opportunity for technology development which may lead to greatly improved emissions performance in the next decade.

123 CONG. REC. 26,848 (1977). This provision represented a compromise between the Senate bill, which al-

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[40] *See, e.g.*, 45 Fed. Reg. 5480, 5503 (1980) (individual vehicle emissions of particulates from one model halved by NO_x waiver); *id.* at 5490 (30% reduction in roadside particulate exposure levels resulting from waiver); Daimler-Benz Waiver Application at I-12, J.A. 947 (8% decrease in total particulate emissions).

lowed only a two-year waiver of the 1.0 gpm NO_x standard for innovative technologies, and the House bill, which provided indefinite waivers for four or more years as long as the public health would not be endangered.[41]

Relying on this legislative history, the EPA interprets the air quality benefit criterion as requiring only that there be "a substantial likelihood that the engines will be able to comply with the statutory standards applicable at the expiration of the waiver period." 45 Fed. Reg. 5486, 5493 (1980). As long as diesel vehicles have the potential for meeting those standards, no loophole has been opened and the statute is satisfied.

This is not the only possible interpretation of the air quality benefit provision, but it is not an implausible one. "Where different interpretations of the statute are plausible, so long as EPA's construction of the statute is reasonable we may not substitute our own interpretation for the Agency's." *Lead Industries Ass'n v. EPA*, No. 78-2220, slip op. at 29-30 (D.C. Cir. June 27, 1980), *cert. denied*, 101 S. Ct. 621 (1980). We decline the NRDC's invitation to hold that no waiver may be granted unless diesel emissions are found to be harmless.

The NRDC finds the EPA's interpretation illogical, asserting that its application to the particulate standards is totally circular. The NO_x waivers are being justified by the ability of diesels to meet particulate standards that are themselves defined so that every diesel can meet those standards if given a NO_x waiver. The NRDC regards it as absurd to see air quality benefit in compliance with standards so lacking in content.

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[41] The Senate bill had provided innovative technology waivers only for model years 1980 and 1981, H.R. 6161, 95th Cong., 1st Sess. § 23, 123 CONG. REC. 18,525 (1977), *reprinted in* 3 LEGISLATIVE HISTORY 1171-72, while the House bill was based on the Dingell-Broyhill amendments, which gave four years as the *minimum* length for a waiver, *see* 123 CONG. REC. 16,918 (1977).

It is true that there is a certain element of paradox in regarding achievement of technology-based standards as demonstrating a benefit. But this paradox is not an inevitable corollary of the EPA's interpretation of section 202(a)(6)(B)(iii). The effective circularity of this criterion as applied to particulates results specifically from the EPA's choice of the worst-performing diesel as the measure of particulate performance. As we have held, that choice is a permissible regulatory strategy but is in no way mandated by the statute. *See* Part II(C) *supra*. The air quality benefit criterion will be more substantial when applied to pollutants regulated under other schemes.

Finally, the NRDC complains that the EPA misconstrued Senator Muskie's reference to "statutory emissions standards" as implicating only the explicit numerical standards for hydrocarbons, carbon monoxide, and NO_x, instead of including other emissions standards set by the EPA under its statutory authority. This claim is unfounded. The portion of the EPA's guidelines for waiver applications that relates to the air quality benefit criterion requires information concerning particulates and other unregulated pollutants, *see* 43 Fed. Reg. 30,341, 30,346-47 (1978), and the May 1980 waiver decisions explicitly recognized that the standards applicable at the end of the waiver period include the 0.6 gpm particulate standard, *see* 45 Fed. Reg. 34,719, 34,723-24 (1980). The first waiver decisions, in January 1980, did not mention this standard, but this was understandable, as it had not yet been promulgated.

In conclusion, we find no merit in the NRDC's allegations that the EPA granted NO_x waivers unlawfully, at undue risk to the public health. The agency's actions were consistent with a reasonable interpretation of the statutory provisions.

IV. The Hydrocarbon Test Procedure

One small issue remains. At the same time that the EPA issued its particulate regulations, it also modified the test procedures for measuring hydrocarbon emissions from diesel vehicles. *See* 45 Fed. Reg. 14,496, 14,500 (1980). GM challenges that method.

Application of heat during the hydrocarbon measuring process results in the release in free, gaseous form of hydrocarbons that would at lower temperatures have remained adsorbed to the surface of particulates. The EPA's hydrocarbon test procedure counts these as hydrocarbons; the particulate test counts them as particulates. GM objects to measurement of these emissions as hydrocarbons, asserting that they do not contribute to air pollution problems, and that GM is a victim of double counting.

The EPA rejected GM's complaints on several grounds; we agree with all of these. First, the statute *requires* the agency to measure total hydrocarbon emissions, regardless of the reactive potential of individual hydrocarbon compounds. 45 Fed. Reg. 48,133, 48,140 (1980). This court has already upheld the EPA's attention to total hydrocarbon emissions as a valid administrative interpretation of the Act, even in the context of *admittedly* nonreactive hydrocarbons. *Ford Motor Co. v. EPA*, 604 F.2d 685 (D.C. Cir. 1979). Second, the EPA found GM's test data exonerating adsorbed hydrocarbons unconvincing, because "the tests performed were unrealistic in simulating atmospheric conditions." 45 Fed. Reg. 14,496, 14,505 (1980). The EPA thus regarded it as an open question whether particle-bound hydrocarbons contribute first to the particulate problem and then later to the hydrocarbon pollution problem as well. Analysis of Comments at 132, J.A. 454.

Finally, despite GM's characterization of the test as "double counting," GM has not shown that it is prejudiced by inclusion of adsorbed hydrocarbons in the *particulate* measurements. Adsorbed hydrocarbons are included in determining compliance with the absolute statutory hydrocarbon emission standard, and so their measurement is significant. But the particulate standards are technology-based, and therefore are set at a level that already includes any inflation due to adsorbed hydrocarbons. 45 Fed. Reg. 48,133, 48,140 n.76 (1980). We do not see any "fundamental unfairness for the vehicle manufacturers" in this test procedure.

V. Conclusion

In the Clean Air Act, Congress encouraged the EPA to set standards for the future without specifying the methodology the agency must follow to determine the probable course of future technological growth. In these circumstances, a reviewing court's role is to make sure that the agency has acted responsibly in formulating a reasoned prediction. It is not our task to decide whether the agency is correct, or to require proof to a mathematical certainty. We must be satisfied if the agency has undertaken its analysis with the degree of precision and clarity that the subject inherently permits. The EPA has done so in this case.

We find no merit in the NRDC's allegations that the EPA granted NO_x waivers unlawfully, at undue risk to the public health. We similarly reject the NRDC's challenges to the particulate standards as inconsistent with the statutory mandate. We uphold the EPA's hydrocarbon testing procedure, and accept as sufficiently reasoned the EPA's prediction of technological availability and the particulate standards based thereupon. The regulations reviewed in this proceeding, in their entirety, are

Affirmed.

ROBB, *Circuit Judge, concurring in part and dissenting in part:* I concur in Part III of the court's opinion, upholding the EPA's grant of NOx waivers to various diesel manufacturers. I must dissent, however, from that part of the opinion in which the court sustains the particulate standards for 1985. In my view the record does not support the EPA's prediction that the necessary technology will be available in time to meet the 1985 standard. My doubts focus in particular on the inability of the auto manufacturers to develop a filtering material for trap-oxidizers that possesses the durability needed to withstand periodic incineration of collected particulates for the useful life of the vehicle.

The majority states that "the EPA will have demonstrated the reasonableness of its basis for prediction if it answers any theoretical objections to the trap-oxidizer method, identifies the major steps necessary in refinement of the device, and offers plausible reasons for believing that each of those steps can be completed in the time available." *Ante* at 17. I have no quarrel with this standard, but I do not agree that the EPA has offered plausible reasons for believing that the critical step of achieving the required level of trap durability can be completed in the time available.

The record demonstrates that General Motors (GM) alone, which began its particulate control research program in 1974, has tested many different trap materials provided by at least 16 different manufacturers.[1] Of these materials, 22 are characterized by GM as "the

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[1] AC, Burlington, Carborundum, DuPont, Englehard, Granlin, GMR, Hoskins, ICI American, International Steel Wool, James River, Metex, Mitsubishi, Purex, Texaco, and The Catalyst Co. (J.A. 234)

best materials" available,[2] based on tests conducted with an Opel 2.1 liter diesel engine and an Oldsmobile 5.7 liter diesel engine. (J.A. 237) Yet the durability of even the best of these materials—the metal mesh—is far below what will be needed to meet the standard. The most successful test results were obtained by installing a metal mesh trap in a GM Opel, which was then driven on a non-typical schedule with no hard accelerations, hills, or speeds above 45 miles per hour. The filtering material survived only 12,800 miles, at which time it had a collection efficiency of 55 percent. GM also reported some particulate "blow-off" (i.e., particulate matter escaping through the exhaust system) and self-incineration. (J.A. 530) The statute, however, establishes a useful life for light duty vehicles and light duty vehicle engines of "five years or fifty thousand miles (or the equivalent), whichever first occurs." 42 U.S.C. § 7521(d)(1) (Supp. I 1977). Furthermore, the EPA stated in its Regulatory Analysis of the particulate standards that the trapping material "should last at least 100,000 miles." (J.A. 530)

After acknowledging the shortcomings of the Opel test, the EPA summarized the status of trap-oxidizer research as follows:

> Clearly, more basic research still needs to be done in the areas of regeneration initiation and control, and trap durability. Enough progress has been achieved to convince EPA that a successful trap-oxidizer can be developed, but as of this time, no

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[2] Corrugated foil fecralloy; chopped fecralloy; chromium alloy ribbon; glass fiber fabric; fiberfrax fiber fabric; alumina fiber material; catalyst beads of a variety of types including quadralobe, trilobe, low density spheres, large quadralobe, porous ceramic, small bead, and "prod." catalyst; ceramic monolith, extruded and low density; torturous path, ceramic; ceramic bobbin; metal mesh; alumina coated metal mesh; metal wool; paper; and fiberglass. (J.A. 238-42)

> design has proven to have the required collection efficiency over the desired length of time. With the research that has been, and is, going on with regards to trap-oxidizer development, and a determined broad-based effort by the manufacturers to comply with the final standards, EPA's technical staff has concluded that it is very likely that a successful trap-oxidizer design can be optimized within the next 1½ to 2 years.

(J.A. 531) In my opinion, these exhortations to the manufacturers and the EPA's vaguely articulated faith that a "design can be optimized" soon do not amount to "plausible reasons for believing that each of [the necessary] steps can be completed in the time available," within the meaning of the majority's standard. Pious hope and speculation cannot take the place of evidence. Accordingly, I must dissent from Part II of the court's opinion.

UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

September Term, 1980
Argued 10-28-80

No. 80-1464

GENERAL MOTORS CORPORATION, *Petitioner*

v.

DOUGLAS M. COSTLE, ADMINISTRATOR UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, *Respondent*

Volkswagen Of America, Inc., Natural Resources Defense Council, Inc., Mercedes-Benz of North America, Inc., *Intervenors*

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and Consolidated Cases

BEFORE: Robb, Mikva and Ginsburg, Circuit Judges

Order

(Filed May 27, 1981)

On consideration of petitioner's petition for rehearing, filed May 6, 1981, it is

ORDERED by the Court that the aforesaid petition for rehearing is denied.

Per Curiam

FOR THE COURT:

George A. Fisher, *Clerk*

/s/ ROBERT A. BONNER
Robert A. Bonner
Chief Deputy Clerk

Circuit Judge Robb would grant the petition for rehearing.

UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

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GENERAL MOTORS CORPORATION, *Petitioner*

v.

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Volkswagen Of America, Inc., Natural Resources Defense Council, Inc., Mercedes-Benz of North America, Inc., *Intervenors*

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and Consolidated Cases

BEFORE: Robinson, Chief Judge, Wright, McGowan, Tamm, MacKinnon, Robb, Wilkey, Wald, Mikva, Edwards and Ginsburg, Circuit Judges

Order

Filed May 27, 1981

Petitioner's suggestion for rehearing *en banc* has been circulated to the full Court. A majority of the Court has not voted in favor of the suggestion. On consideration of the foregoing, it is

ORDERED by the Court *en banc* that the aforesaid suggestion is denied.

Per Curiam

FOR THE COURT:

George A. Fisher, *Clerk*

/s/ ROBERT A. BONNER
Robert A. Bonner
Chief Deputy Clerk

Circuit Judges Tamm, MacKinnon, Robb and Wilkey would grant the suggestion for rehearing *en banc*.

Circuit Judges McGowan and Wald did not participate in the foregoing order.

28 U.S.C. §1254. Courts Of Appeals; Certiorari; Appeal; Certified Questions

Cases in the courts of appeals may be reviewed by the Supreme Court by the following methods:

(1) By writ of certiorari granted upon the petition of any party to any civil or criminal case, before or after rendition of judgment or decree;

(2) By appeal by a party relying on a State statute held by a court of appeals to be invalid as repugnant to the Constitution, treaties or laws of the United States, but such appeal shall preclude review by writ of certiorari at the instance of such appellant, and the review on appeal shall be restricted to the Federal questions presented;

(3) By certification at any time by a court of appeals of any question of law in any civil or criminal case as to which instructions are desired, and upon such certification the Supreme Court may give binding instructions or require the entire record to be sent up for decision of the entire matter in controversy. June 25, 1948, c. 646, 62 Stat. 928.

28 U.S.C. §1651. Writs

(a) The Supreme Court and all courts established by Act of Congress may issue all writs necessary or appropriate in aid of their respective jurisdictions and agreeable to the usages and principles of law.

(b) An alternative writ or rule nisi may be issued by a justice or judge of a court which has jurisdiction. June 25, 1948, c. 646, 62 Stat. 944; May 24, 1949, c. 139, §90, 63 Stat. 102.

42 U.S.C. §7521(a)(1)

Sec. 202. (a) Except as otherwise provided in subsection (b)—

(1) The Administrator shall by regulation prescribe (and from time to time revise) in accordance with the provisions of this section, standards applicable to the

emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines, which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare. Such standards shall be applicable to such vehicles and engines for their useful life (as determined under subsection (d), relating to useful life of vehicles for purposes of certification), whether such vehicles and engines are designed as complete systems or incorporate devices to prevent or control such pollution.

42 U.S.C. §7521(a)(2)

Sec. 202(a)(2) Any regulation prescribed under paragraph (1) of this subsection (and any revision thereof) shall take effect after such period as the Administrator finds necessary to permit the development and application of the requisite technology, giving appropriate consideration to the cost of compliance within such period.

42 U.S.C. §7521(a)(3)(A)(iii)

Sec. 202(a)(3)(A)(iii)(iii) The Administrator shall prescribe regulations under paragraph (1) of this subsection applicable to emissions of particulate matter from classes or categories of vehicles manufactured during and after model year 1981 (or during any earlier model year, if practicable). Such regulations shall contain standards which reflect the greatest degree of emission reduction achievable through the application of technology which the Administrator determines will be available for the model year to which such standards apply, giving appropriate consideration to the cost of applying such technology within the period of time available to manufacturers and to noise, energy, and safety factors associated with the application of such technology. Such standards shall be promulgated and shall take effect as expeditiously as practicable taking into account the period necessary for compliance.

42 U.S.C. §7521(d)(1)

Sec. 202(d) The Administrator shall prescribe regulations under which the useful life of vehicles and engines shall be determined for purposes of subsection (a)(1) of this section and section 207. Such regulations shall provide that useful life shall—

(1) in the case of light duty vehicles and light duty vehicle engines, be a period of use of five years or of fifty thousand miles (or the equivalent), whichever first occurs;

42 U.S.C. §7607
General Provisions Relating To Administrative Proceedings And Judicial Review

Sec. 307. (a)(1) In connection with any determination under section 110(f) or section 202(b)(5), or for purposes of obtaining information under section 202(b)(4) or 211(c)(3), the Administrator may issue subpenas for the attendance and testimony of witnesses and the production of relevant papers, books, and documents, and he may administer oaths. Except for emission data, upon a showing satisfactory to the Administrator by such owner or operator that such papers, books, documents, or information or particular part thereof, if made public, would divulge trade secrets or secret processes of such owner or operator, the Administrator shall consider such record, report, or information or particular portion thereof confidential in accordance with the purposes of section 1905 of title 18 of the United States Code, except that such paper, book, document, or information may be discussed to other officers, employees, or authorized representatives of the United States concerned with carrying out this Act, to persons carrying out the National Academy of Sciences' study and investigation provided for in section 202(c), or when relevant in any proceeding under this Act. Witnesses summoned shall be paid the same fees and mileage that are paid witnesses in the courts of the United States. In cases of contumacy or refusal to obey a subpena served upon

any person under this subparagraph, the district court of the United States for any district in which such person is found or resides or transacts business, upon application by the United States and after notice to such person, shall have jurisdiction to issue an order requiring such person to appear and give testimony before the Administrator to appear and produce papers, books, and documents before the Administrator, or both, and any failure to obey such order of the court may be punished by such court as a contempt thereof.

(b)(1) A petition for review of action of the Administrator in promulgating any national primary or secondary ambient air quality standard, any emission standard or requirement under section 112, any standard of performance or requirement under section 111,[7] any standard under section 202 (other than a standard required to be prescribed under section 202(b)(1)), any determination under section 202(b)(5), any control or prohibition under section 211, any standard under section 231, any rule issued under section 113, 119, or under section 120, or any other nationally applicable regulations promulgated, or final action taken, by the Administrator under this Act may be filed only in the United States Court of Appeals for the District of Columbia. A petition for review of the Administrator's action in approving or promulgating any implementation plan under section 110 or section 111(d), any order under section 111(j), under section 112(c), under section 113(d), under section 119, or under section 120, or his action under section 119(c)(2)(A), (B), or (C) (as in effect before the date of enactment of the Clean Air Act Amendments of 1977) or under regulations thereunder, or any other final action of the Administrator under this Act (including any denial or disapproval by the Administrator under title I) which is local or regionally applicable may be filed only in the United States Court of Appeals for the appropriate circuit. Notwithstanding the preceding sentence a petition for review of any action

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[7] Public Law 95-95 inserted the additional "," after the words "under section 111".

referred to in such sentence may be filed only in the United States Court of Appeals for the District of Columbia if such action is based on a determination of nationwide scope or effect and if in taking such action the Administrator finds and publishes that such action is based on such a determination. Any petition for review under this subsection shall be filed within sixty days from the date notice of such promulgation, approval, or action appears in the Federal Register, except that if such petition is based solely on grounds arising after such sixtieth day, then any petition for review under this subsection shall be filed within sixty days after such grounds arise.

(2) Action of the Administrator with respect to which review could have been obtained under paragraph (1) shall not be subject to judicial review in civil or criminal proceedings for enforcement.

(c) In any judicial proceeding in which review is sought of a determination under this Act required to be made on the record after notice and opportunity for hearing, if any party applies to the court for leave to adduce additional evidence, and shows to the satisfaction of the court that such additional evidence is material and that there were reasonable grounds for the failure to adduce such evidence in the proceeding before the Administrator, the court may order such additional evidence (and evidence in rebuttal thereof) to be taken before the Administrator, in such manner and upon such terms and conditions as the court may deem proper. The Administrator may modify his findings as to the facts, or make new findings, by reason of the additional evidence so taken and he shall file such modified or new findings, and his recommendation, if any, for the modification or setting aside of his original determination, with the return of such additional evidence.

(d)(1) This subsection applies to—

(A) the promulgation or revision of any national ambient air quality standard under section 109,

(B) the promulgation or revision of an implementation plan by the Administrator under section 110(c),

(C) the promulgation or revision of any standard of performance under section 111 or emission standard under section 112,

(D) the promulgation or revision of any regulation pertaining to any fuel or fuel additive under section 211,

(E) the promulgation or revision of any aircraft emission standard under section 231,

(F) promulgation or revision of regulations pertaining to orders for coal conversion under section 113(d)(5) (but not including orders granting or denying any such orders),

(G) promulgation or revision of regulations pertaining to primary nonferrous smelter orders under section 119 (but not including the granting or denying of any such order),

(H) promulgation or revision of regulations under subtitle B of title I (relating to stratosphere and ozone protection),

(I) promulgation or revision of regulations under subtitle C of title I (relating to prevention of significant deterioration of air quality and protection of visibility),

(J) promulgation or revision of regulations under section 202 and test procedures for new motor vehicles or engines under sectoin 206, and the revision of a standard under section 202(a)(3),

(K) promulgation or revision of regulations for noncompliance penalties under section 120,

(L) promulgation or revision of any regulations promulgated under section 207 (relating to warranties and compliance by vehicles in actual use),

(M) action of the Administrator under section 126 (relating to interstate pollution abatement), and

"(N) such other actions as the Administrator may determine. The provisions of section 553 through 557 and section 706 of title 5 of the United States Code shall not, except as expressly provided in this subsection, apply to action to which this subsection applies. This subsection shall not apply in the case of any rule or circumstance referred to in subparagraphs (A) or (B) of subsection 553(b) of title 5 of the United States Code.

(2) Not later than the date of proposal of any action to which this subsection applies, the Administrator shall establish a rulemaking docket for such action (hereinafter in this subsection referred to as a "rule"). Whenever a rule applies only within a particular State, a second (identical) docket shall be established in the appropriate regional office of the Environmental Protection Agency.

(3) In the case of any rule to which this subsection applies, notice of proposed rulemaking shall be published in the Federal Register, as provided under section 553(b) of title 5, United States Code, shall be accompanied by a statement of its basis and purpose and shall specify the period available for public comment (hereinafter referred to as the "comment period"). The notice of proposed rulemaking shall also state the docket number, the location or locations of the docket, and the times it will be open to public inspection. The statement of basis and purpose shall include a summary of—

(A) the factual data on which the proposed rule is based;

(B) the methodology used in obtaining the data and in analyzing the data; and

(C) the major legal interpretations and policy considerations underlying the proposed rule.

The statement shall also set forth or summarize and provide a reference to any pertinent findings, recommendations, and comments by the Scientific Review Committee established under section 109(d) and the National Academy of Sciences, and, if the proposal differs in any important respect from any

of these recommendations, an explanation of the reasons for such differences. All data, information, and documents referred to in this paragraph on which the proposed rule relies shall be included in the docket on the date of publication of the proposed rule.

(4) (A) The rulemaking docket required under paragraph (2) shall be open for inspection by the public at reasonable times specified in the notice of proposed rulemaking. Any person may copy documents contained in the docket. The Administrator shall provide copying facilities which may be used at the expense of the person seeking copies, but the Administrator may waive or reduce such expenses in such instances as the public interest requires. Any person may request copies by mail if the person pays the expenses, including personnel costs to do the copying.

(B)(i) Promptly upon receipt by the agency, all written comments and documentary information on the proposed rule received from any person for inclusion in the docket during the comment period shall be placed in the docket. The transcript of public hearings, if any, on the proposed rule shall also be included in the docket promptly upon receipt from the person who transcribed such hearings. All documents which become available after the proposed rule has been published and which the Administrator determines are of central relevance to the rulemaking shall be placed in the docket as soon as possible after their availability.

(ii) The drafts of proposed rules submitted by the Administrator to the Office of Management and Budget for any interagency review process prior to proposal of any such rule, all documents accompanying such drafts, and all written comments thereon by other agencies and all written responses to such written comments by the Administrator shall be placed in the docket no later than the date of proposal of the rule. The drafts of the final rule submitted for such review process prior to promulgation and all such written comments thereon, all documents accompanying such drafts, and written

responses thereto shall be placed in the docket no later than the date of promulgation.

(5) In promulgating a rule to which this subsection applies (i) the Administrator shall allow any person to submit written comments, data, or documentary information; (ii) the Administrator shall give interested persons an opportunity for the oral presentation of data, views, or arguments, in addition to an opportunity to make written submissions; (iii) a transcript shall be kept of any oral presentation; and (iv) the Administrator shall keep the record of such proceeding open for thirty days after completion of the proceeding to provide an opportunity for submission of rubuttal and supplementary information.

(6)(A) The promulgated rule shall be accompanied by (i) a statement of basis and purpose like that referred to in paragraph (3) with respect to a proposed rule and (ii) an explanation of the reasons for any major changes in the promulgated rule from the proposed rule.

(B) The promulgated rule shall also be accompanied by a response to each of the significant comments, criticisms, and new data submitted in written or oral presentations during the comment period.

(C) The promulgated rule may not be based (in part or whole) on any information or data which has not been placed in the docket as of the date of such promulgation.

(7)(A) The record for judicial review shall consist exclusively of the material referred to in paragraph (3), clause (i) of paragraph (4)(B), and subparagraphs (A) and (B) of paragraph (6).

(B) Only an objection to a rule or procedure which was raised with reasonable specificity during the period for public comment (including any public hearing) may be raised during judicial review. If the person raising an objection can demonstrate to the Administrator that it was impracticable to raise such objection within such time or if the grounds for such objection arose after the period for public comment (but within

the time specified for judicial review) and if such objection is of central relevance to the outcome of the rule, the Administrator shall convene a proceeding for reconsideration of the rule and provide the same procedural rights as would have been afforded had the information been available at the time the rule was proposed. If the Administrator refuses to convene such a proceeding, such person may seek review of such refusal in the United States court of appeals for the appropriate circuit (as provided in subsection (b)). Such reconsideration shall not postpone the effectiveness of the rule. The effectiveness of the rule may be stayed during such reconsideration, however, by the Administrator or the court for a period not to exceed three months.

(8) The sole forum for challenging procedural determinations made by the Administrator under this subsection shall be in the United States court of appeals for the appropriate circuit (as provided in subsection (b)) at the time of the substantive review of the rule. No interlocutory appeals shall be permitted with respect to such procedural determinations. In reviewing alleged procedural errors, the court may invalidate the rule only if the errors were so serious and related to matters of such central relevance to the rule that there is a substantial likelihood that the rule would have been significantly changed if such errors had not been made.

(9) In the case of review of any action of the Administrator to which this subsection applies, the court may reverse any such action found to be—

(A) arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law;

(B) contrary to constitutional right, power, privilege, or immunity;

(C) in excess of statutory jurisdiction, authority, or limitations, or short of statutory right; or

(D) without observance of procedure required by law, if (i) such failure to observe such procedure is arbitrary or capricious, (ii) the requirement of paragraph (7)(B) has

been met, and (iii) the condition of the last sentence of paragraph (8) is met.

(10) Each statutory deadline for promulgation of rules to which this subsection applies which requires promulgation less than six months after date of proposal may be extended to not more than six months after date of proposal by the Administrator upon a determination that such extension is necessary to afford the public, and the agency, adequate opportunity to carry out the purposes of this subsection.

(11) The requirements of this subsection shall take effect with respect to any rule the proposal of which occurs after ninety days after the date of enactment of the Clean Air Act Amendments of 1977.

(e) Nothing in this Act shall be construed to authorize judicial review of regulations or orders of the Administrator under this Act, except as provided in this section.

(f) In any judicial proceeding under this section, the court may award costs of litigation (including reasonable attorney and expert witness fees) whenever it determines that such award is appropriate.

(g) In any action respecting the promulgation of regulations under section 120 or the administration or enforcement of section 120 no court shall grant any stay, injunctive, or similar relief before final judgment by such court in such action.

42 U.S.C. §7607(d)(9)

Sec. 307 (d)(9) In the case of review of any action of the Administrator to which this subsection applies, the court may reverse any such action found to be—

(A) arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law;

(B) contrary to constitutional right, power, privilege, or immunity;

(C) in excess of statutory jurisdiction, authority, or limitations, or short of statutory right; or

(D) without observance of procedure required by law, if (i) such failure to observe such procedure is arbitrary or capricious, (ii) the requirement of paragraph (7)(B) has been met, and (iii) the condition of the last sentence of paragraph (8) is met.

14496 Federal Register / Vol. 45, No. 45 / Wednesday, March 5, 1980 / Rules and Regulations

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 86

[FRL 1011-7]

Standard for Emission of Particulate Regulation for Diesel-Fueled Light-Duty Vehicles and Light-Duty Trucks

AGENCY: Environmental Protection Agency.

ACTION: Final rule.

SUMMARY: This rule estabiishes a standard for the emission of particulate matter from diesel-fueled light-duty vehicles and light-duty trucks.[1] Beginning with the 1982 model year, this standard is 0.60 gram per mile (0.37 gram per kilometer) for both diesel-fueled light-duty vehicles and light-duty trucks. Manufacturers will have the option of certifying their vehicles to this standard for the 1981 model year if they desire to carryover their 1981 certification results to the 1982 model year. Beginning with the 1985 model year the standard is 0.20 gram per mile (0.12 gram per kilometer) for diesel-fueled light-duty vehicles and 0.26 gram per mile (0.16 gram per kilometer) for diesel-fueled light-duty trucks. This action also amends the emission testing regulations at 40 CFR Part 86 to establish procedures for the testing of new diesel-fueled light-

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[1] The designation "light-duty truck" used in this regulation is based upon the definition of this class of vehicles which appears in §86.07 of 40 Code of Federal Regulations. According to the interpretations of vehicle classes published in the conference report on the 1977 amendments to the Clean Air Act H.R. Rep. No. 95-564, 95th Cong. 1st Sess. 164, "the recent classification of vehicles between 6,000 and 8,500 pounds as light-duty trucks would continue to be appropriate provided regulations developed for such vehicles conform to this section" Light-duty vehicles and light-duty trucks are distinct classes of motor vehicles but have a similar operating characteristics, share similar engine types, and are tested using similar test procedures.

duty vehicles and light-duty vehicles and light-duty trucks to determine compliance with the applicable particulate emission standard. In addition, this action deletes separate test procedures for Selective Enforcement Audits (SEA) beginning immediately and will require that the test procedures used for certification be used for SEA with some exceptions which will be discussed below.

The statutory authority for this action is provided in Sections 202 and 301(a) of the Clean Air Act (42 U.S.C. 7521 and 7601). Section 202(a)(3)(A)(iii) of the Act provides, in part, that "The Administrator shall prescribe regulations under paragraph (1) of this subsection applicable to emissions of particulate matter from classes or categories of vehicles manufactured during and after model year 1981 (or during any earlier model year, if practicable)." Section 301(a) provides, in part, that "the Administrator is authorized to prescribe such regulations as are necessary to carry out his functions under this Act."

EFFECTIVE DATE: April 4, 1980.

ADDRESSES: Materials relevant to this Final Rule are contained in Public Docket No. OMSAPC-78-3 at the U.S. Environmental Protection Agency, Central Docket Section, Waterside Mall, Room 2903B (EPA Library), 401 M Street, SW., Washington, D.C. 20460, (202) 755-0308. These materials include the transcript of the public hearing held in connection with the proposed rule, written comments received in response to the proposed rule, EPA's detailed summary and analysis of these oral and written comments, and the Regulatory Analysis containing environmental and economic analyses and the analysis of alternatives. Copies of these materials are available on request. (As provided in 40 CFR Part 2 the Agency may charge a reasonable fee for copying services.)

FOR FURTHER INFORMATION CONTACT: Merrill W. Korth or Jeff Alson, Standards Development and Support Branch, Emission Control Technology Division, Environmental Pro-

tection Agency, 2565 Plymouth Road, Ann Arbor, Michigan 48105, Telephone: (313) 668-4200.

SUPPLEMENTARY INFORMATION: Despite significant gains made in the control of particulate emissions from stationary sources, there are many air quality regions which are not able to meet the primary National Ambient Air Quality Standard (NAAQS) for total suspended particulate (TSP) matter of 75 micrograms per cubic meter (annual mean). As diesel-fueled vehicles assume an increasing portion of the light-duty vehicle market, their contribution to ambient TSP and fine particulate levels will increase because diesel-fueled engines emit approximately 30 to 70 times the amount of particulate that is emitted by gasoline-fueled engines equipped with catalytic converters.

EPA expects that between 15 and 25 percent of all new light-duty vehicles and trucks sold by the late 1980's will be powered by diesel engines. These light-duty diesels would have emitted between 152,000 and 253,000 metric tons of particulate matter annually by 1990 without control. EPA arrived at this figure by assuming that between 10 and 17 percent of the total miles traveled by light-duty vehicles and light-duty trucks would be by diesels in 1990. Urban areas would be most heavily affected by these emissions. Ambient particulate levels from light-duty diesels alone would have reached 2-11 micrograms per cubic meter (annual geometric mean) in cities such as Chicago, Los Angeles, New York, and Dallas. Somewhat smaller levels of 2-7 micrograms per cubic meter (annual geometric mean) would have occurred in smaller cities such as St. Louis, Denver, and Phoenix. These levels would have been expected to occur over large-scale areas within these cities. Additional particulate levels of 5-9 micrograms per cubic meter (annual geometric mean) would have been expected in localized areas within 90 meters of very busy roadways. These impacts would be almost exclusively comprised of fine and inhalable particles, which have the greatest potential for adverse health effects.

On February 1, 1979 EPA proposed standards for the emission of particulate matter from diesel-fueled light-duty vehicles and light-duty trucks under the authority of Sections 202(a)(3)(A)(iii) and 301(a) of the Clean Air Act. EPA held a public hearing on March 19-20, 1979 in Washington, D.C., to allow for public comment on the proposed rule. The Agency also held a prior public hearing in Ann Arbor, Michigan to allow General Motors to present its concept of a corporate average particulate standard. Written comments concerning the proposed regulation were permitted to be submitted through April 19, 1979. Eleven parties made presentations at the hearing held in Washington and twenty-eight parties submitted written comments. The majority of these comments were from automobile manufacturers; though congressmen, Federal agencies, environmental groups and private citizens also commented. EPA then analyzed these comments and revised the proposed rule as necessary in light of the comments. A description of the standards and test procedures being promulgated follows, along with a discussion of the technological, environmental and economic impacts of the regulation and of the major comments made concerning the proposed rule.

Standards: Beginning with the 1982 model year, standards for both diesel-fueled light-duty vehicles and light-duty trucks will be 0.60 gram per mile (0.373 gram per kilometer) as tested over the standard EPA Urban Dynamometer Driving Schedule. Beginning with the 1985 model year, the particulate emission standard will be 0.20 gram per mile (0.124 gram per kilometer) for diesel-fueled light-duty vehicles and 0.26 gram per mile (0.162 gram per kilometer) for diesel-fueled light-duty trucks.

The initial standard as proposed was to become effective beginning with the 1981 model year. EPA's analysis of technology and leadtime concluded that the manufacturers did have the ability to meet the 0.60 gram per mile (0.373 gram per kilometer) standard in 1981. However, there was not enough time available to ensure that the manufacturers could

complete their certification programs if they had not begun the certification process before final promulgation of the particulate standards. While EPA expects most, if not all, engine families to meet the 0.60 gram per mile (0.373 gram per kilometer) level in 1981, we cannot require the industry to do so because of the insufficient amount of time between promulgation and the 1981 model year. Given this situation, EPA has decided to promulgate the 0.60 gram per mile (0.373 gram per kilometer) standard for the 1982 model year but to allow optional certification to this standard in 1981. Since the gaseous emission standards do not change from 1981 to 1982, a manufacturer would incur full certification costs in both 1981 and 1982 if it waited to demonstrate compliance with the particulate standard until 1982. Thus, we expect some manufacturers to attempt to certify to the voluntary standard in 1981 and carryover the particulate results to 1982 in order to reduce certification costs. Since the initial particulate standard does not go into effect until 1982, particulate emission testing on 1981 certification vehicles would be prohibited, unless authorized by the Administrator, under §86.080-26(a)(10) of 40 Code of Federal Regulations. The Administrator will provide this authorization (via written correspondence) to those manufacturers which want to certify to the optional standard in 1981 for carryover puposes, provided that those manufacturers abide by the test procedures that are required for particulate measurement for 1982 and later model year vehicles.

The second emission standard for both vehicle classes was originally proposed to be 0.20 gram per mile (0.124 gram per kilometer) beginning with the 1983 model year. The implementation of the second standard was delayed two years to ensure optimum development of the necessary control technology. The level of the standard for light-duty trucks was raised to take into account their higher inertia weight and aerodynamic drag. These vehicles will still be required to comply with the applicable gaseous emission standards for hydrocarbon, carbon monoxide, and oxides of nitrogen.

Technology: The Clean Air Act Amendments of 1977 mandate particulate emission control based upon best available control technology, considering costs and other specified factors. EPA believes that both the 1982 and 1985 particulate standards for light-duty diesels can be achieved in the time available.

EPA expects that only minor engine modifications will be necessary for current light-duty diesels to meet the 1982 standard of 0.60 gram per mile (0.373 gram per kilometer). This determination is based in part on the availability of waiver of the statutory oxides of nitrogen (NO_x) standard of 1.0 gram per mile (0.62 gram per kilometer) for light-duty diesel engine families produced during model years 1981-1984. Since manufacturers have presented data to show that use of exhaust gas recirculation (EGR), currently the most popular NO_x control technology, increases particulate emissions, EPA has examined both NO_x and particulate levels in assessing the feasibility of the particulate standards. EPA already has granted NO_x waivers for several 1981-82 model year light-duty diesel engine families in order to allow those manufacturers which showed an inability to achieve the 1.0 gram per mile (0.62 gram per kilometer) NO_x standard in 1981 sufficient leadtime to reduce NO_x emissions with acceptable durability and particulate emissions control (44 FR (January, 1980)). Other light-duty diesel engine families for which sufficient emissions data is provided to show their emissions control capabilities also may be allowed to meet a less stringent, interim NO_x standard.

In addition, particulate and NO_x emissions results which have been achieved on prototypes or past EPA certification vehicles (see Table 1) show that the NO_x emissions of all these vehicles, except for the Volkswagen Audi, are below the maximum interim standard allowed under the NO waiver provision. All of the vehicles exhibit particulate emissions below the 0.6 gram per mile (0.373 gram per kilometer) level being promulgated by EPA. Volkswagen stated in its comments to the proposed particulate regulations that the Audi would be able to meet the 0.6 gram per mile (0.373 gram per kilometer)

level by 1982 with a NO_x waiver. Volkswagen's application for a waiver for the Audi was denied due to presentation of insufficient data upon which to base a waiver determination. However, Volkswagen may reapply for a waiver. Therefore, EPA expects the availability of the diesel NO_x waiver to allow all light-duty diesels to comply with the 1982 particulate standard.

The 0.20 gram per mile (0.124 gram per kilometer) particulate standard in 1985 can be met by the successful application of an aftertreatment technology. EPA expects trap-oxidizers to be the preferred aftertreatment technology. A trap-oxidizer is simply a trap with a mechanism by which the collected particulate is oxidized to regenerate the trap and to maintain the collection efficiency and exhaust gas back-pressure at acceptable levels. The three most critical issues with respect to the feasibility of trap-oxidizers are (1) collection efficiency, (2) trap regeneration, and (3) trap durability.

The particulate collection efficiencies of many trap materials are very good. Efficiencies of 60 to 65 percent have been reported by manufacturers for several materials, such as alumina-coated metal mesh, metal wool, and quadralobe catalyst beads, and EPA has tested alumina-coated steel wool trap material which was 50 to 60 percent efficient. Because of the particulate reductions expected from other strategies (discussed later in this section), only a 60 percent efficiency will be required for the worst case vehicles to meet the 0.20 gram per mile (0.124 gram per kilometer) standard. The requisite initial-efficiency has been achieved with several materials; the question is how to maintain this efficiency through repetitive regenerations over the useful life of the vehicle.

Several trap-oxidizer regeneration approaches have been investigated. The simplest solution would be to continuously (or near-continuously) oxidize the particulate, in which case the trap-oxidizer would function much like a diesel catalytic converter. The problem with diesel converters is simply in maintaining the high-temperature conditions that ensure continual oxidation. Much effort is being expended on producing

converters which would function on diesels, and designs have been tested by EPA that are close to what is needed. An alternative is to oxidize the particulate only occasionally, when enough organic material has been collected by the trap to aid the process and when the exhaust temperature is high enough to initiate oxidation. Many approaches have been suggested to initiate the oxidation process, but the most promising is the addition of an inlet air throttle, which would limit the intake air into the combustion chambers, thus raising the temperature of the exhaust. The throttling would be perodic, and could be actuated by a combination of the odometer reading and rack position, or might have to be linked to a controller unit coordinating several parameters such as rack position, back-pressure, exhaust gas recirculation, etc. GM reported that over a 1000-mile series of load-up and regeneration tests, utilizing throttling to initiate oxidation, the trap collection efficiency actually increased slightly. There appear to be no technical problems with utilizing throttling to initiate oxidation, and there is evidence that throttling may possibly reduce engine-out particulate and NO_x emissions slightly.

Collection efficiencies and regeneration techniques have progressed to the point where the most critical issue is whether the efficiency and regeneration mechanism can be maintained over the useful life of the vehicle. At this time, EPA has limited trap-oxidizer durability data, as researchers have been reluctant to fund durability testing until other, more basic questions were solved. The problems of durability are problems which lend themselves to engineering solutions; no major new technology is required. We are confident that the durability questions will be resolved in the near future.

EPA is very confident that trap-oxidizers will be available to permit compliance with the 1985 standard. As discussed above, the basic concept of the trap-oxidizer is well understood. The improvements that are necessary are engineering problems, and are more a function of the resources allocated to the problem than any scientific or technical breakthrough. Considerable progress has occurred in the last 1½ years. In-

itial aftertreatment research concentrated on the use of simple traps and gasoline engine catalytic converters, with basic problems of efficiency and backpressure. In the last 1½ years we have seen marked improvements in efficiency and backpressure, and more importantly, a general consensus that the trap-oxidizer can periodically (and possibly even continually) incinerate the particulate matter. Methods for regeneration initiation and control have been investigated and repetitive incineration has been demonstrated for several trap-oxidizers. There is every reason to expect that with a concerted effort by industry, this progress will continue and will result in trap-oxidizers being available for vehicle application by the 1985 model year. EPA has tested trap-oxidizers from several corporations, and the manufacturers are working with many catalyst, petrochemical, and materials companies in an attempt to produce a satisfactory trap-oxidizer design.

In fact, EPA's technical analysis concluded that there is a strong likelihood that trap-oxidizers will be sufficiently developed by the 1984 model year (see the Regulatory Analysis). Because of the uncertainty that exists with regard to trap-oxidizer durability and vehicle applications, however, EPA has decided to minimize the economic risk of this rulemaking by delaying the implementation of the 0.20 gram per mile (0.124 gram per kilometer) standard until 1985. This extra year will have only a marginal effect on ambient suspended particulate levels yet will ensure that the manufacturers have enough time to optimize trap-oxidizer application. The 1985 implementation date gives the manufacturers 3 to 3½ years of development leadtime since publication of the NPRM, and 2 to 2½ years of development leadtime from publication of the Final Rule, in addition to the 2 to 2½ years of production leadtime deemed necessary.

Particulate emissions are a classic economic externality for the automotive industry. Left to the marketplace, it is extremely unlikely that sufficient pressure would be brought to bear on the industry to aggressively pursue trap-oxidizer development. Experience has shown the greatest emission con-

trol development work to have taken place when direct regulatory incentives were in place. Since final trap-oxidizer designs are not now available to successfully comply with the 1985 standard, to the extent that the standard motivates the industry to aggressively pursue research and development it is a "technology-forcing" standard. The term "technology-forcing" often implies that the sought-after technology is completely unknown or unforeseeable, but such is not the case here. The basic concept of the trap-oxidizer is very well understood, and, as explained above, much development has already occurred. Indeed, many commenters stated or implied that successful application of trap-oxidizers was feasible. Thus, this rulemaking is technology-forcing only in the respect that it will encourage a feasible control strategy that might otherwise be ignored.

In addition to the lower particulate standard in 1985, the light-duty vehicle diesel NO_x standard will drop to 1.0 gram per mile (0.62 gram per kilometer) in the 1983 to 1985 time frame (waivers are possible until 1985). Should manufacturers rely on heavier rates of EGR to achieve the lower NO_x levels, particulate levels will increase due to the recognized deleterious effect of EGR on particulate emissions. EPA expects that as the particulate/EGR relationship becomes better understood, and as the EGR controls become more sophisticated (possibly applying greater EGR rates during low particulate modes and lesser EGR at higher particulate modes), this negative effect of EGR on paraticulate will be lessened. EPA expects additional particulate reductions from further engine modifications and optimizations (including turbocharging) and from continued downsizing of the manufacturers' largest vehicles. All diesel light-duty vehicle manufacturers are expected to be able to comply with the 0.20 gram per mile (0.124 gram per kilometer) particulate and 1.0 gram per mile (0.62 gram per kilometer) NO_x standards in 1985.

EPA analyzed the available data on the effects of the greater inertia weight and road load settings of light-duty trucks on particulate emissions and concluded that the differ-

ences between light-duty vehicles and light-duty trucks could increase particulate emissions by 30 percent. Thus, EPA increased the 1985 standard for light-duty trucks to 0.26 grams per mile (0.162 gram per kilometer). Until 1985, light-duty trucks will only have to comply with a 2.3 grams per mile (1.43 grams per kilometer) NO_x standard, which is far less stringent than the 1.0 to 1.5 grams per mile (0.62 gram to 0.93 gram per kilometer) NO_x standard with which light-duty vehicles must comply. Given the current trade-off between NO_x and particulate emissions, EPA concluded that the less stringent NO_x standard more than made up for the increased inertia weight and road load horsepower settings of light-duty trucks and that no adjustment to the particulate standard was needed until 1985. EPA expects the very same technologies that will be used to meet the light-duty vehicle standards to be applicable to light-duty trucks.

Environmental Impact: Section 202(a)(3)(A)(iii) directs EPA to control particulate emissions; it does not require that the Agency first conduct an environmental impact assessment. Nevertheless, EPA has carefully examined the environmental impact of this rulemaking.

If a final market penetration for diesels of 15—25% is estimated (actual 1990 light-duty fleet being 10—17 percent diesel), these standards will reduce particulate emissions from light-duty diesels by 74 percent in 1990 with respect to what would be expected without these regulations. National particulate emissions in 1990 from light-duty diesels will be reduced from approximately 152,000—253,000 metric tons per year to 40,000—66,000 metric tons per year. Urban emissions from these vehicles will also decrease 74 percent in 1990 from 84,000—141,000 metric tons per year to 22,000—37,000 metric tons per year. This emission reduction will reduce ambient light-duty diesel particulate levels in large cities (e.g., New York, Chicago, Dallas) from 2.0—11.3 to 0.5—2.9 micrograms per cubic meter. Light-duty diesel particulate levels in smaller cities (e.g., St. Louis, Pittsburgh) will also decrease from 1.5—7.5 to 0.4—1.9 micrograms per cubic

meter. Localized levels which occur over and above these larger-scale impacts will also decrease from 5—9 micrograms per cubic meter to 1—2 micrograms per cubic meter. These latter impacts could occur as far as 90 meters away from very busy roadways.

The above impacts clearly show the significant ambient light-duty diesel particulate emission level reductions that are expected from these regulations. But not all types of particulate matter have the same level of impact on human health. Small particles, which are much more likely to be deposited in the alveolar region and which require much longer periods of time to be cleared from the respiratory tract, have a greater potential to affect human health than larger particles. Thus, control of diesel particulate, of which 100 percent is less than 15 micrometers in diameter and approximately 97 percent of which is less than 2.5 micrometers in diameter, is especially important with respect to human health. There is also particular concern over the chemical composition of diesel particulate emissions, as the extractable organic fraction of diesel particulate has been shown to be mutagenic in short-term bioassays, and EPA is currently performing a health assessment to determine the carcinogenic risk (if any) to human health. EPA believes that this uncertainty is another factor which necessitates priority control of diesel particulate emissions. Should future results from the diesel health effects studies indicate that further action is necessary to control particulate emissions, EPA will exercise its authority under title II to do so.

Economic Impact: EPA expects the retail price of light-duty diesel vehicles and trucks to increase by approximately $11—12 in 1982 and by $138—164 in 1985 due to the vehicle modifications necessitated by this regulation. The wider range of costs for the 1985 standard is simply due to possible differences in trap-oxidizer systems which may be used on different models. These estimates include profit at both the manufacturer and dealer levels. As a result of past and future increases in the price of gasoline-fueled vehicles attributable to

emission controls, EPA expects no decrease in diesel sales relative to the sales of gasoline-fueled vehicles as a result of the aggregate environmental regulation. The trap-oxidizer system is also expected to require maintenance costing about $30 over its useful life. However, the vehicle modifications involved in adding the trap-oxidizer will eliminate the need to replace the exhaust pipe and muffler throughout the vehicle's life. This will save about $80 in maintenance costs during the vehicle's life (at the fifth year). In all, vehicle maintenance costs should decrease by $50 due to the 1985 standard. All costs are in terms of 1979 dollars.

The aggregate cost of the first standard over the three years it will be in effect will be $42—76 million depending on total light-duty diesel sales (present value taken in 1985, 1979 dollars). The aggregate cost of the second standard over five years (1985—1989) will be $897—1857 million (present value taken in 1985, 1979 dollars). The aggregate costs were calculated using 1985 as the present value reference point, since this is the year the more significant of the two standards (with respect to economics) is being implemented. By using a future year as the reference point, the aggregate costs better represent the monies the nation will be required to spend in some future year to control light-duty diesel particulate emissions. If the present time had been used as the present value reference point (as it was when this regulation was proposed), the aggregate costs would better represent the monies the nation would be required to set aside today for the control of light-duty diesel particulate emissions in the future. From present value theory, the latter aggregate costs would numerically appear much smaller than those cited above, but would indeed represent the same real costs. While these costs are significant, they are affordable. The added costs should not hamper the marketability of diesel vehicles.

Cost Effectiveness: Section 202(a)(3)(A)(iii) of the Clean Air Act does not require EPA to conduct a cost benefit analysis. Nevertheless, EPA has examined the cost effectiveness of the standards. EPA examined the traditional methodology

used to measure cost effectiveness of particulate control strategies and modified it slightly. In general, the traditional methodology focused only on total emission reductions and not on health and air quality improvements. After improving the methodology somewhat, the final standard appears consistent with recent EPA actions to control stationary source particulate emissions which in themselves were cost effective.

For example, the traditional measure of cost effectiveness (dollars per metric ton of particulate controlled) can be made more relevant to health improvements by considering only the inhalable (less than or equal to 15 micrometers in diameter) or fine (less than or equal to 2.5 micrometers in diameter) particulate that is controlled. It is the inhalable and, especially, the fine fractions of suspended particulate which appear to have the greatest potential for adverse health impacts. When only these fractions are considered, the marginal cost effectiveness ratio for the 1985 standard is $2,400—3,025 per metric ton of inhalable particulate and $2,500—3,150 per metric ton of fine particulate. When these bases are used, the cost effectiveness of light-duty diesel control is found to be consistent with the cost effectiveness of particulate control strategies implemented in the past.

It is important to emphasize that in some respects the mobile and stationary source strategies for particulate control have certain differences in their primary purposes. Therefore, selections of a measure of effectiveness for comparison purposes has inherent limitations. In spite of these, however, the comparison may still be useful to the degree that it focuses on one of these common purposes, protection of public health and welfare.

There is another step which could be taken to improve the measure of cost effectiveness and that is to relate it to reductions in ambient pollution concentrations instead of emission reductions. People's exposure to pollutants is directly related to the ambient pollutant concentration of the air they breathe, but only indirectly related to the emissions from various sources. However, the data necessary to perform such

calculations are very difficult to obtain and generally not available. Still, to indicate the potential differences between the air quality impacts of different sources and the extent that the results of the previous paragraph can be misleading, a very rough air quality analysis was performed. Using some rough indicators of a source's impact on air quality relative to its emissions, EPA found that light-duty diesels produce between 32 and 134 times the ambient pollutant concentration produced by the largest power plants (2,920 megawatt heat input) based on equivalent emission rates. Similarly, light-duty diesels produce between 0.8 and 3.4 times the ambient pollutant concentration produced by smaller power plants (73 megawatt heat input), based on equivalent emission rates. No localized impacts from either source were examined, only large-scale impacts. If localized impacts had been examined, the results might be different.

The results for other stationary sources could also be quite different. Just considering this one factor, the results of any comparison of cost effectiveness can be changed drastically and there are many other factors which should also be considered. As mentioned earlier, the above ratios are only an extremely rough estimate of the relative air quality impacts of diesels and power plants. Many simplifications were necessary to be able to make this comparison at all. However, the results also indicate clearly that control of diesel particulate is no less cost-effective than other cost-effective control measures adopted by EPA using the measures of effectivenss discussed above.

Alternative Actions: Control of particulate emissions from light-duty diesel vehicles is required by the Clean Air Act. Thus, EPA does not have the authority to forego control of light-duty diesel particulate emissions in favor of other control strategies. However, other control strategies were examined in the course of this rulemaking and they include: (1) Further control of stationary particulate sources; (2) control of mobile sources of particulate emissions other than diesel-fueled light-

duty vehicles and light-duty trucks; (3) sales-weighted average particulate standards for light-duty vehicles and light-duty trucks, averaged over either a manufacturer's total production or a manufacturer's diesel production; and (4) alternative individual vehicle standards and/or implementation dates for diesel-fueled light-duty vehicles and light-duty trucks.

The potential reduction in particulate emissions from light-duty diesels is significant when compared to aggregate emissions from major stationary source categories. Most major urban areas are unable to attain the ambient standard for particulate matter even after the application of reasonable controls to stationary sources. New Source Performance Standards can only mitigate the impact of new source growth and reductions such as those projected for these diesel regulations will be necessary to attain ambient standards.

The only other significant mobile sources of particulate emissions are diesel-fueled heavy-duty vehicles. The Clean Air Act also requires the control of heavy-duty diesel particulate emissions and a proposal to do so is now being developed. Because a transient test procedure is necessary to adequatcly measure particulate emissions, and since the heavy-duty engine transient test procedure is not required for diesels until 1985, particulate regulations for heavy-duty vehicles are not scheduled to be implemented until 1985. The planned heavy-duty diesel particulate regulations do not obviate or lessen the need for light-duty diesel particulate regulations.

Two approaches which would require each manufacturer to meet a sales-weighted average particulate standard, one which would include all light-duty vehicles and trucks and one which would involve only diesel-fueled light-duty vehicles and trucks, were examined as alternatives to the individual vehicle standards. Although both offered increased flexibility and the possibility of cost savings to the manufacturers (no specific estimates were presented), both averaging approaches were rejected due to statutory, equity, enforcement, and localized impact problems (see the discussion under the Public Participation section below). Should interested parties submit informa-

tion on the relative advantages and disadvantages of a diesel average particulate standard, with particular attention to the problems mentioned above, EPA will, of course, evaluate them.

Finally, alternative levels of control and implementation dates for the individual vehicles standards were rejected because the standards and implementation dates selected are consistent with the requirement of Section 202(a)(3)(A)(iii) of the Clean Air Act. In addition, the adopted standards and implementation dates are cost effective when compared to other particulate emission controls that have been promulgated by EPA.

Test Procedures: In the past, provisions for testing diesel-fueled vehicles have been included in the Federal Test Procedure (FTP) along with those for gasoline-fueled vehicles. The testing specified for diesels applied to the same gaseous pollutants (HC, CO, NO_x) regulated for gasoline-fueled vehicles. Now, with the additional mandated regulation of particulate emissions from light-duty diesel vehicles, EPA has made major additions and changes to sections of the FTP. These changes affect only diesel testing, but due to their inclusion into the existing FTP there are some minor numbering and clarification changes in the test procedures for gasoline-fueled vehicles.

Additions and changes to the current FTP for diesels which are brought about by the incorporation of particulate testing are discussed below:

(1) The particulate measurement procedure requires a dilution tunnel and a constant volume sampler. The dilution tunnel must be sufficiently long to assure thorough mixing at the sampling probes. The use of a mixing box with extensive baffling is ruled out due to suspected particulate loss on its surfaces. The constant volume sampler must have sufficient capacity to maintain a maximum temperature of 125°F (51.7°C) at the probe tips. (Constant volume sampler units presently used for gaseous analysis may not be sufficiently

large to maintain this maximum temperature when used in conjunction with larger engine displacement light-duty diesels). The proposed use of the dilution tunnel and constant volume sampler in this manner will assure that the diesel exhaust is in a state of equilibrium with the surrounding air similar to what would be encountered in actual road use;

(2) The total mass of particulate emissions is measured simultaneously with regulated gaseous emission over the Urban Dynamometer Driving Schedule. The particulate matter, after dilution and mixing with ambient air in a dilution tunnel, is collected on filter media maintained at 125°F (51.7°C) or less over each of the three phases (bags) of the driving cycle;

(3) Hydrocarbons are continuously measured and integrated over each of the three phases (bags) of the test by a heated flame ionization detector (HFID). The hydrocarbon sampling system consists of three elements: (1) A sample probe which is placed in the dilution tunnel at a distance sufficiently downstream that thorough mixing of the gas stream is assured, (2) a filter to remove all particulate matter from the sample gas stream and (3) the HFID. The entire sampling system from the probe tip to the HFID is heated to prevent condensation and to assure the measurement of all hydrocarbons which are volatile at or below the set temperature. The gas streams entering the particulate filter and HFID must be maintained 375 ± 20°F ($191 \pm$ °C).

These changes to the FTP will also apply to Selective Enforcement Audit (SEA) testing, beginning with the 1982 model year. Currently, the test procedures for SEA are incorporated in a separate appendix to 40 CFR Part 86. Separate test procedures were published for SEA based on a suggestion by several manufacturers that all of the details of the application of the FTP in certification may not be appropriate in the context of SEA. However, EPA's experience with testing under the SEA program since its implementation indicates that there is no compelling reason to continue to have separate test procedures for SEA. Therefore, this regulation deletes separate

SEA test procedures beginning immediately and applies the certification test procedures to SEA. Some clarifications have been made which did not appear in the proposal in insure that those requirements of the FTP not appropriate for SEA (e.g., evaporative HC testing, insertion of thermocouples into fuel tanks) are not required for SEA.

EPA has found that the gaseous emissions results from the test procedures that have been designed to incorporate particulate measurement (featuring a dilution tunnel) are not significantly different than gaseous emissions results obtained from the test procedures now in use (featuring a mixing box). Diesel manufacturers which exercise their option to test for particulate emissions in 1981 (in order to carry over data to 1982) must abide by the particulate/dilution tunnel test procedures which are mandatory for diesel testing in 1982 and later model years. EPA will use the same test procedures for confirmatory certification testing of particulate and gaseous emissions in 1981. Diesel manufacturers which choose not to measure particulate emissions on their 1981 certification vehicles have the option of using either set of test procedures for gaseous emissions testing. EPA retains the authority to utilize either set of test procedures for confirmatory certification testing of gaseous emissions in 1981, but at this time, in order to conserve resources, EPA intends to use the particulate/dilution tunnel test procedures for confirmatory gaseous emissions testing in 1981. We do not expect the Agency's use of the particulate/dilution tunnel test procedures for 1981 confirmatory certification testing of gaseous emissions to prevent any difficulties to the manufacturers since: (1) The gaseous emissions results from the particulate/dilution tunnel test procedures are not significantly different from those from the current test procedures, (2) the proposal was for 1981 so manufacturers should have been planning to have the new test equipment in place by 1981 anyway, and (3) we received no major comments disputing the ability of manufacturers to obtain the required test equipment for 1981. In any case, manufacturers which do not participate in the optional par-

ticulate certification program in 1981 can use either set of test procedures in their own compliance testing. It should be noted that EPA is offering the optional certification program in order to enable manufacturers to reduce certification costs.

High Altitude: This action does not establish an interim high altitude standard for the 1982—1983 model years. Light-duty diesel vehicles and trucks sold in high altitude areas will only have to comply with the particulate standard at low altitude. EPA will soon publish a separate rulemaking implementing Clean Air Act Section 206(f)(1), which states that: "All light-duty vehicles and engines manufactured during or after model year 1984 shall comply with the requirements of section 202 of this Act regardless of the altitude at which they are sold."

Nonconformance Penalties: Section 206(g) of the Clean Air Act states that a nonconformance penalty should be available " * * * in the case of any class or category of heavy-duty vehicles or engines to which a standard promulgated under section 202(a) of this Act applies * * * " According to the Act, "heavy-duty vehicle means a truck, bus, or other vehicle manufactured primarily for use on the public streets, roads, and highways which has a gross vehicle weight in excess of 6,000 pounds." A portion of the diesel light-duty truck population has a gross vehicle weight greater than 6,000 pounds and these vehicles are considered heavy-duty vehicles by the act. Thus, it might appear that nonconformance penalties should be available.

These regulations, however, do not provide a nonconformance penalty alternative for manufacturers of this category of heavy-duty vehicles. The legislative history behind Section 206(g) indicates that a nonconformance penalty alternative was to be made available to accommodate manufacturers who are technological laggards and are unable to meet emission standards set according to the technological leader among manufacturers of a class or category of vehicles or engines. These regulations set particulate emission standards

for light-duty diesel trucks (including those which qualify as heavy-duty vehicles) according to the emission reduction capabilities of the light-duty diesel truck industry as a whole. We project that all members of the light-duty truck industry will be capable of complying with these standards, and hence, expect that there will be no technological laggards that will need to be accommodated by a nonconformance penalty alternative. Thus, no nonconformance penalty scheme has been included in this regulation. However, the question of whether or not nonconformance penalties are appropriate for light-duty trucks with gross vehicle weights in excess of 6,000 pounds is still under consideration by the Agency.

Public Participation: With the proposal of this regulation on February 1, 1979, EPA requested comments from all interested parties on any or all aspects of this regulation. In addition, a public meeting was held on March 16, 1979 to allow General Motors to present its corporate averaging proposal. A public hearing to discuss all aspects of the regulation was held on March 19—20, 1979. The comments received centered on five major areas: (1) The environmental impact of light-duty diesels; (2) sales-averaged standards as a means of control; (3) the technological feasibility of the standards; (4) the economic impact of the regulations; and (5) the test procedures. Discussions of the major comments in each of these areas follow below.

Environmental Impact: A number of commenters questioned the ambient levels of diesel particulate which EPA projected would occur in 1990. They argued that EPA (1) used a regional dispersion model which overestimates mobile source impacts; (2) overestimated growth in traffic in downtown areas; (3) overemphasized the impact in Kansas City without adequate justification for extrapolation to the rest of the nation; (4) used unrealistic diesel sales projections; and (5) overemphasized localized impact using an inaccurate model. EPA analyzed these comments and found that: (1) The regional dispersion model used is more likely to underestimate mobile source impacts than to overestimate them; (2) the projected

traffic growth rate of 1.5% per year is likely too high and has been reduced to 1% per year; (3) too much emphasis was placed on Kansas City and this has been alleviated by extending EPA's analysis to include over 30 cities; (4) the projected scenarios for diesel sales did overestimate diesel sales in the early and mid 1980's and a revised scenario (based on several studies) has been developed resulting in a 16% reduction in the diesel fraction of light-duty traffic in 1990; and (5) an overemphasis of the localized impact did occur due to deficiencies in the model used; to correct this, more accurate models have been used and the results have been given a more proper emphasis.

The net result of these comments and the subsequent improvement of the analysis was that the impact of light-duty diesels on air quality became more prominent. While some factors which had led to an overestimation of the impact were corrected, the extension of the analysis to more cities revealed that the mobile source impact in Kansas City is much lower than that in other urban areas. As these differences were not adequately accounted for in the original analysis, their inclusion has definitely increased EPA's projection of ambient concentrations of diesel particulate in urban area.

Some commenters also requested that EPA take into consideration those aspects of diesel particulate which may cause it to be more harmful to health than other types of particulate matter. Although Section 202(a)(3)(A)(iii) does not provide for consideration of this factor as a basis for setting the standards, EPA has added a section to its Regulatory Analysis which examines the importance of the size and chemical composition of diesel particulate.

Finally, some commenters raised questions concerning the validity of the population exposure estimate made in EPA's original analysis. EPA found some of these concerns to be valid. As the need to promulgate this regulation in time for the 1982 model year was a pressing one, time did not allow a full analysis and revision of the population exposure estimate.

As the estimate was not crucial to the regulation, it was deleted from the Regulatory Analysis.

Sales-Averaged Standards: The commenters suggested two possible alternative approaches to the individual vehicle standards which EPA has traditionally used to control mobile source emissions. One approach would require the sales-weighted average particulate level of each manufacturer's entire (diesel and gasoline-powered) light-duty vehicle fleet to be equal to or less than a Corporate Average Particulate Standard (CAPS). The second approach would exclude gasoline-powered vehicles from the averaging procedure so that each manufacturer's sales-weighted diesel average particulate level would have to comply with a Diesel Average Particulate Standard (DAPS). Both approaches would give manufacturers greater flexibility and the possibility of cost savings in being able to meet particulate emission standards. With CAPS, more lower particulate-emitting gasoline-fueled vehicles could be sold to reduce the average emission level if a manufacturer found its diesel emissions too high. With DAPS, a manufacturer could trade off large diesels which typically have high particulate emissions with smaller diesels which tend to have lower particulate emissions. This could result in lower costs of control as a manufacturer could optimize its control of both small and large cars to reach the average standard at the lowest cost. An additional advantage of CAPS (but not DAPS) is that it would put an implicit ceiling on total light-duty diesel particulate emissions to the atmosphere.

While CAPS does provide the advantage discussed above, EPA finds too many difficulties associated with its implementation and we reject it as an alternative to the individual vehicle standards. In the first place, it raises difficult and novel questions under the structure of Title II of the Clean Air Act. For example, Sections 202 and 207 assume individual vehicle compliance with the applicable standards. A second drawback involves manufacturer equity. Since the CAPS concept averages diesel and gasoline-powered vehicle particulate levels, and since the latter are typically very low, a manufacturer's

corporate average particulate level would be dependent not only on its diesel vehicle particulate levels but also on its relative proportion of diesel to gasoline-powered vehicles. A manufacturer which produced a small percentage of diesels could tolerate much higher particulate levels from its diesels, and still comply with a specific CAPS, than could a manufacturer which marketed a much higher percentage of diesels. CAPS licenses a manufacturer to produce greater quantities of and progressively higher particulate-emitting diesels as it increases its gasoline-powered vehicle production. EPA considers this to be unacceptable. CAPS might also act to restrain competition in the industry as a firm which wanted to produce only light-duty diesel vehicles would likely find it impossible to comply with CAPS without also producing similar quantities of gasoline-powered vehicles. Another major problem with CAPS concerns enforcement. Changing from enforcement on an engine family basis with each family having to meet the same standard to enforcement on a fleet-wide basis with a multitude of different engine family standards would require a new enforcement apparatus and would likely result in unforseeable problems. Finally, since CAPS would only be useful to the industry if the maximum allowable emission rate was greater than the corresponding individual vehicle standards (otherwise the manufacturers would gain nothing from the averaging approach) CAPS would increase the possibility of localized particulate impact problems in certain cities, downtown areas, or roadways which might have an unusually high concentration of diesels emitting at or near the maximum level allowed.

DAPS is much more equitable to diesel manufacturers than is CAPS. Regardless of the quantity of gasoline-powered or diesel vehicles a manufacturer produces, each manufacturer would have to comply with the same average diesel particulate level. Analysis of the data available to us has suggested that DAPS levels consistent with best available control technology would not provide much flexibility to the manufacturers, however, since DAPS precludes the averaging of gasoline-

powered vehicle particulate levels and since it becomes more difficult to "balance out" a high particulate-emitting diesel with lower particulate-emitting diesels as the standard decreases. Like other averaging approaches, DAPS raises difficult and novel questions under the structure of Title II of the Clean Air Act which assumes individual vehicle compliance with applicable standards. Although DAPS does not share the manufacturer inequity problems of CAPS, it does share the remaining problems discussed above: it would result in different standards for different engine families, it would involve cumbersome enforcement problems, and it would increase the likelihood of localized impact problems. Based on these problems, EPA rejects the use of DAPS in favor of the individual vehicle standards. (For a more thorough discussion of CAPS and DAPS, see the Regulatory Analysis, Chapter VIII.)

Technological Feasibility: EPA originally proposed standards of 0.60 gram per mile (0.373 gram per kilometer) in 1981 and 0.20 gram per mile (0.124 gram per kilometer) in 1983 for light-duty diesel vehicles and light-duty diesel trucks, which was based on the use of engine modifications and turbochargers in 1981 with the subsequent addition of trap-oxidizers in 1983. Most of the light-duty diesel manufacturers commented that these standards were not achievable in the time allowed. A number of reasons were given for this: (1) That the simple addition of a turbocharger often did not reduce particulate levels, and in any case, could not be integrated into production designs by the 1981 model year; (2) that trap-oxidizers were still an unproven technology and could not be perfected by the 1983 model year; (3) tha EPA had not considered important parameters such as emissions deteriorations and variability; and (4) that EPA had failed to recognize the deleterious effect of lower NO_x requirements on particulate levels.

EPA analyzed these comments and the available data and concluded that: (1) Turbochargers can reduce particulate levels if properly integrated into the vehicle design, but will

not be universally available until 1983; (2) the successful application of trap-oxidizers would not likely occur until at least 1984; (3) deterioration and variability should be considered; and (4) the levels of the standards would only be feasible in the near term if some relaxation of the 1.0 gram per mile (0.62 gram per kilometer) NO_x standard was granted through the waiver provision of Section 202(b)(6)(B) of the Clean Air Act for at least some engine families. As noted above, the NO_x waiver has already been granted for several engine families through 1982, and the waiver may be extended to other engine families or past 1982 if manufacturers provide information showing it to be necessary.

In addition, EPA determined that much greater particulate reductions had been achieved through engine modifications than had been expected and that the 1981 standard of 0.60 gram per mile (0.373 gram per kilometer) could be met without the addition of turbochargers. However, because of insufficient certification leadtime for 1981, the 0.60 gram per mile (0.373 gram per kilometer) standard will not apply until the 1982 model year.

EPA agrees with the majority of the commenters that trap-oxidizers are not now feasible for production application. Advances are still needed in the areas of collection efficiency, durability, and regeneration initiation and control. The information submitted by commenters working on trap-oxidizer development in response to the Notice of Proposed Rulemaking has convinced EPA that trap-oxidizers can be successfully utilized to reduce particulate emissions.

EPA's technical analysis concluded that there was a strong possibility that trap-oxidizers could be utilized on 1984 model year vehicles, but due to the uncertainty involved the implementation date has been delayed until 1985. Additional particulate reductions will likely be derived from further engine modifications, turbocharging, and downsizing, and the negative effect of greater NO_x control on particulate levels is expected to diminish by 1985. Thus, EPA concludes that all manufacturers should be able to comply with the 0.20 gram

per mile (0.124 gram per kilometer) particulate standard in 1985 with a NO_x standard of 1.0 gram per mile (0.62 gram per kilometer).

Thus, the levels of the particulate standards for light-duty diesel vehicles have been retained at 0.60 and 0.20 gram per mile (0.373 and 0.124 gram per kilometer), respectively, but the implementation dates have been delayed to 1982 and 1985.

Some concern was expressed about the possibility of the trap-oxidizer being a safety hazard in operation. Certainly safety should be a primary trap-oxidizer design parameter. EPA expects trap-oxidizers to have the same type of safety characteristics as oxidation catalytic converters; in any case, EPA would not require a particulate control technology that was known to involve serious safety problems. If during the development of the trap-oxidizer safety problems are discovered, EPA would reconsider the control requirements implemented by this rulemaking.

With respect to the standards for diesel-powered light-duty trucks, some commenters requested that EPA take into account the heavier inertia weight and larger size of these vehicles and increase their standards accordingly. EPA analyzed the available data on the effects of inertia weight and road load on particulate emissions and concluded that the difference between light-duty vehicles and light-duty trucks could increase particulate emissions by 30 percent. This factor was then considered in the analysis of light-duty truck standards noted above.

Economic Impact: A number of commenters questioned the costs that EPA had estimated for certain control techniques, such as engine modifications, turbochargers, and trap-oxidizers. In response, EPA re-examined its analyses and revised its estimates of these costs. The cost of engine modifications has been increased from $1 to $10 per vehicle to better reflect the cost of development and retooling. The cost of turbocharging has been increased from $145—185 to $207—238 per vehicle due primarily to the inclusion of engine modifica-

tions necessary for acceptance of the turbocharger which were omitted in the initial analysis. However, based upon data and comments from manufacturers, EPA no longer expects that turbochargers will be needed to comply with the standards. Last, EPA has increased its estimated cost of trap-oxidizers to $128—224 per vehicle from $114—157 per vehicle. The cost increase is primarily due to an increase in the size of the trap-oxidizer required to obtain the desired efficiency, and the addition of the cost of stainless-steel exhaust pipes. Maintenance costs were also revised in this area. A $30 charge was added to reflect possible maintenance of the trap-oxidizer system and an $80 savings was added to reflect the elimination of one in-use replacement of the exhaust pipe and muffler.

A large number of commenters questioned EPA's 8 percent estimate of the fuel economy improvement resulting from turbocharging. Most commenters stated that the improvement should be lower while one stated that the improvement was greater than 8 percent. EPA analyzed the data submitted with the comments and concluded that the fuel economy improvement should indeed be 8 percent.

Two commenters questioned EPA's projection that fuel prices would increase 10 percentage points per year faster than the general price index. EPA analyzed trends in fuel prices and the general price index over the last six years and determined that a more appropriate difference in the two inflation rates would be 5 percentage points per year. This was the recommendation of one of the two commenters.

Two comments were made that EPA had underestimated the cost of test equipment modifications required by this regulation. EPA revised its original estimates for a larger flow sample system and for inflation. The revised costs are $55,000 per test cell and $30,000 per test facility. The original costs were $40,000 per test cell and $8,000 per test facility.

Finally, one commenter questioned the cost effectiveness of the final standard and presented what it believed to be a more effective alternative strategy. EPA examined the alter-

native control strategy, street cleaning, and found it to be unproven in its ability to reduce ambient particulate levels over a large area.

Test Procedure: The comments received in this area centered on three aspects of the test procedure: Double-counting of some hydrocarbon emissions, the 125°F (52°C) maximum temperature requirement for the particulate sample zone, and the procedure for assessing the efficiency of the particulate filter.

Several commenters objected that EPA's proposed test procedure considers those hydrocarbon emissions which are associated with particulate matter at 125°F (52°C) but which are not associated with particulate matter at 375°F (191°C), as both hydrocarbons with respect to the standard for hydrocarbon emissions and particulate with respect to the particulate standard. EPA has done this purposely because it believes that particulate related hydrocarbons could interact in the atmosphere both in the formation of oxidant and as particulate matter. One commenter did submit data in an attempt to demonstrate that these hydrocarbons would not react in the atmosphere to form oxidants. EPA has not accepted this conclusion because the tests performed were unrealistic in simulating atmospheric conditions. This double-counting does not affect the stringency of the particulate standard since the standard is technology-based and has been based on tests with particulate sample zone temperatures of 125°F (52°C) or less. Thus any change in the test procedures affecting particulate measurement would likely result in different standards of equivalent stringency.

A number of commenters claimed that EPA's proposed maximum temperature for the particulate sample zone is arbitrary. This is not the case. EPA must measure emissions in a state as close as possible to that occurring in the atmosphere without causing unreasonable burden. As engine exhaust is much hotter than the ambient temperature to which it eventually is cooled, it is beneficial to reduce the exhaust temperature as near as possible to ambient temperatures. Both EPA

and industry data indicate that particulate emissions begin to decrease above 125°F. Thus, to adequately determine the true amount of particulate entering the atmosphere, EPA has concluded that the 125°F limit is necessary.

Finally, some commenters stated that the proposed method of assessing filter efficiency is unacceptable. Due to the specific comments of each of these commenters, EPA has revised its filter acceptance criteria from 98% to 95% efficiency. A back-up filter will be required during all certification tests and if the measured efficiency is below 95%, the test will not be voided, but the weight of the particulate on the back-up filter will be added to that of the first filter.

Evaluation Plan: EPA intends to review the effectiveness and need for continuation of this regulation within five years after the implementation of the final standard. Since the final standard first affects the 1985 model year, its implementation date will be taken to be September 1, 1984. Thus, EPA will have completed its review by September 1, 1989. This review will include a public request for information concerning the cost and effectiveness of the regulation some time in 1987.

Reporting and Recordkeeping Requirements: This regulation does not require any new reporting or recordkeeping requirements. However, it does add particulate matter to the list of exhaust pollutants which are currently regulated from diesel-powered light-duty vehicles and trucks. As such it will have some impact on the current load of reporting and recordkeeping requirements. Specifically, it will require: (1) Submission of the design of all new emission control systems added solely for the purpose of particulate control as part of the manufacture's application for certification; and (2) inclusion of the rate of particulate emission from affected vehicles along with other test results. Both of these additions are quite minor compared with the current reporting requirements. Detailed designs of the diesel engine are already required and the only device likely to come under (1) above is the trap-oxidizer. Similarly, results from gaseous emission tests are

already required and these regulations will only require the addition of a few numbers to two pages of values.

Given that the reporting requirements of this regulation only involve minor additions to existing requirements, EPA does not find it reasonable to automatically delete these requirements unless affirmative action is taken within five years. The effort required of manufacturers by such a review (i.e., requests for comment) could even exceed that of the additional requirements of this regulation. Rather, EPA believes that it is in the public's best interests to perform a review of the reporting requirements of this regulation along with the review of all of the reporting requirements of mobile source air pollution regulation. This overall review of reporting requirements will be part of an overall review of the regulations themselves which will take place within the next five years.

Note.—The Administrator has determined that this action is a "Significant" regulation. We have prepared a document entitled "Light-Duty Diesel Particulate Regulations: Regulatory Analysis" detailing the Regulatory Analysis required Executive Order 12044 and the Economic Impact Assessment required by Section 317 of the amended Clean Air Act. Anyone may review and reproduce this document in the EPA Central Docket Section. Copies are also available upon request.

Dated: February 20, 1980.

Douglas M. Costle,

Administrator.

Federal Register / Vol. 45, No. 140 / Friday, July 18, 1980 / Rules And Regulations

40 CFR Part 86

[FRL 1538-3]

Denial Of Petition For Reconsideration Of The Particulate Emissions Regulation For Diesel Fueled Light-Duty Vehicles And Light-Duty Trucks

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of Denial of Petition for Reconsideration.

SUMMARY: On May 5, 1980, General Motors Corporation (GM) petitioned the Administrator to reconsider the standard for particulate emissions from diesel fueled light-duty vehicles and light-duty trucks promulgated by EPA on March 5, 1980 [45 Fed. Reg. 14496]. The petitioner alleged: (1) that EPA did not adequately consider California's 1982 passenger car standards for oxides of nitrogen in promugating the 1982 Federal particulate standard, (2) that EPA could not find the 1985 Federal particulate standard to be technologically feasible, and (3) that EPA's diesel exhaust hydrocarbon measurement technique should be modified to exclude nonreactive hydrocarbons. In a June 27, 1980, letter and supporting memorandum sent to Dr. Betsy Ancker-Johnson, Vice President for GM's Environmental Activities Staff, the Administrator denied the request for reconsideration. The text of the Administrator's response is published below.

FOR FURTHER INFORMATION CONTACT:

Maureen D. Smith, Office of Mobile Source Air Pollution Control (ANR—455), Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460. (202) 426-2514.

Note.—Under Section 307(b)(1) of the Clean Air Act, judicial review of this action is available *only* by the filing of a petition for review in the United States Court of Appeals for the appropriate circuit on or before September 16, 1980. Under Section 307(b)(2) of the Clean Air Act, the require-

ments of which are the subject of today's notice may *not* be challenged later in civil or criminal proceedings brought by EPA to enforce these requirements.

Dated: July 3, 1980

David G. Hawkins,

Assistant Administrator for Air, Noise and Radiation.

U.S. Environmental Protection Agency,
Washington, D.C. June 27, 1980.

Dr. Betsy Ancker-Johnson,

Vice President, Environmental Activities Staff, General Motors Corp., General Motors Technical Center, Warren, Mich.

Dear Dr. Ancker-Johnson: I would like to respond to General Motor's (GM's) May 5, 1980, petition for reconsideration of the particulate emission standards for diesel fueled light-duty vehicles and light-duty trucks (45 Fed. Reg. 14496, March 5, 1980). GM requested reconsideration of (1) the 1982 model year particulate standard as applicable to vehicles to be sold in California, (2) the 1985 model year particulate standard, and (3) the exhaust hydrocarbon (HC) measurement technique. GM also proposed several revisions to the particulate rule:

1. Eliminate the simultaneous requirement to meet the Federal 0.6 gpm particulate standard and the California 1.0 gpm NO_x standard in the 1982 model year for vehicles built for sale in the State of California either by revoking the waiver of Federal preemption granted by EPA for the California light-duty diesel emission standards or by exempting the light-duty diesel vehicles built for sale in the State of California from the Federal particulate standard of 0.6 gpm.

2. Defer the implementation of the 0.2 gpm particulate standard for the 1985 model year until a clear and technologically supportable determination can be made that such a standard is both feasible and appropriate.

3. Revise the light-duty diesel hydrocarbon measurement technique such that only the normally gaseous exhaust hydrocarbons are measured and compared to the exhaust hydrocarbon standards to determine compliance.

I am denying GM's request that I reconsider and revise the particulate rule for the reasons summarized below and set out more fully in the enclosed memorandum. GM has not presented any evidence which was not already considered by EPA during the rulemaking process. EPA's determinations with regard to the particulate standards and the hydrocarbon measurement technique are consistent with the applicable statutory provisions and are fully supported by evidence contained in the rulemaking record.

GM asserts that California's emission standards were not adequately considered in the particulate rule. However, EPA is neither required nor authorized to consider State standards in determining the technological feasibility of Federal standards, and properly based the 1982 particulate standards on the technological feasibility of meeting the 0.6 grams per vehicle mile (gpm) particulate level in conjunction with applicable Federal requirements. GM's proposal that California vehicles be exempt from the 1982 Federal particulate standard would be contrary to the statutory scheme of Federal preemption, since the stringency of proposed Federal standards would be dictated by existing State standards.

While EPA does have authority to revoke the waiver of Federal preemption granted to California relating to standards for light-duty diesel vehicles, GM has not provided evidence to show that California's 1982 passenger car standards are technologically infeasible given the 1982 Federal particulate rule, nor has EPA determined in the particulate rule that meeting the 1982 particulate standard in California is technologically infeasible. Therefore, it would be inappropriate for EPA to take any action at this time with regard to standards applicable in California in 1982.

GM's assertion that EPA's determination on the technological feasibility of the 1985 Federal particulate standard does not reasonably satisfy the statutory criteria is unsupported by the evidence contained in the rulemaking record. EPA concluded from available evidence on lead time requirements, technological feasibility, cost and other factors, that the basic technology necessary to meet the 1985 standards is well understood, and that the engineering improvements necessary to apply the technology most likely could be made by the 1984 model year. EPA provided an additional model year of lead time in order to allow manufacturers to optimize application of the necessary technology before the standard becomes effective in 1985. Since GM has provided no evidence to show that the lead time provided for development and application of the necessary technology is inadequate, EPA will not consider revising the standards at this time.

GM's objection to the exhaust hydrocarbon measurement technique, which was made previously during the comment period on the proposed rule, raises an issue which already has been resolved by EPA and the courts in the context of an earlier rulemaking. GM, in asserting that EPA should not measure those hydrocarbons which GM claims have been shown to remain absorbed on the diesel particulate and to be unreactive in photochemical oxidation, seeks a significant relaxation of the HC emission standard as applied to diesels. EPA has consistently viewed the HC standard for light-duty vehicles set by Congress in section 202(b) as being based on the measurement of all HC exhaust emissions. This interpretation was upheld by the U.S. Court of Appeals for the District of Columbia Circuit in *Ford Motor Co.* v. *EPA*. If EPA changed the measurement procedure as requested by GM, this, in effect, would reduce the stringency of the statutory HC standard as applied to diesels.

Even if EPA did have the authority to exclude certain types of hydrocarbons (i.e., those that do not contribute to atmospheric ozone formation), the scientific bases for GM's conclusion that the HC adsorbed on particulates do not con-

tribute to ozone formation is, at this point, conjecture. GM's evidence, submitted previously during the rulemaking process, was deemed by EPA to be inconclusive. Therefore, GM's evidence does not establish a basis for revision of the existing test procedure.

Accordingly, GM's petition is denied.

Sincerely yours,

Douglas M. Costle.

Enclosure:

RATIONALE FOR EPA DENIAL OF GENERAL MOTORS CORPORATION PETITION FOR RECONSIDERATION OF THE STANDARD FOR EMISSION OF PARTICULATES FROM DIESEL FUELED LIGHT-DUTY VEHICLES AND LIGHT-DUTY TRUCKS

On May 5, 1980, General Motors Corporation (GM) submitted a petition for reconsideration of the *Standard for Emission of Particulate Regulation for Diesel Fueled Light-Duty Vehicles and Light-Duty Trucks* (45 FR 14496, March 5, 1980). GM requested reconsideration of: (1) the 1982 Federal 0.6 gpm particulate standard as applicable to vehicles to be sold in California, (2) the 1985 Federal 0.2 gpm particulate standard, and (3) the exhaust hydrocarbon measurement technique. GM also proposed several revisions to the particulate rule:

1. Eliminate the simultaneous requirement to meet the Federal 0.6 gpm particulate standard and the California 1.0 gpm NO_x standard in the 1982 model year for vehicles built for sale in the State of California either by revoking the waiver of Federal preemption granted by EPA for the California light-duty diesel emission standards or by exempting the light-duty diesel vehicles built for sale in the State of California from the Federal particulate standard of 0.6 gpm.

2. Defer the implementation of the 0.2 gpm particulate standard for the 1985 model year until a clear and technolog-

ically supportable determination can be made that such a standard is both feasible and appropriate.

3. Revise the light-duty diesel hydrocarbon measurement technique such that only the normally gaseous exhaust hydrocarbons are measured and compared to the exhaust hydrocarbon standards to determine compliance.

GM has not argued either that it was impracticable to raise its objections during the public comment period or that the grounds for the objections arose after the period for public comment.[1] No evidence has been presented which was not already submitted to EPA during the rulemaking process, and GM has not claimed that the information EPA relied on in promulgating the rule has changed in any way. As set out below, the actions taken by EPA in the final rule are consistent with the requirements of the Act, and are supported by evidence contained in the rulemaking record. Moreover, the issues raised in GM's petition do not provide a sufficient basis for EPA to consider revising the final rules. Accordingly, GM's petition is denied.

I. The 1982 Particulate Standard

A. EPA is neither required nor authorized to assess the technological feasibility of meeting California standards in conjunction with proposed Federal standards.

GM contends that the requirement in section 202(a)(3)(A)(iii) of the Clean Air Act, as amended (Act), that EPA consider technological feasibility and available lead time in

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[1] GM apparently has not relied on section 307(d)(7)(B) of the Clean Air Act, as amended, in requesting reconsideration. Under that section, the Administrator must convene a proceeding for reconsideration of the rule if such objection is of central relevance to the outcome of the rule, and if the person raising the objection can meet either of the above criteria. Thus, even if GM had relied on section 307(d)(7)(B) of the Act, if would have failed to meet the specified criteria.

determining particulate standards, includes consideration of the manufacturers' capability of meeting California's 1982 model year 1.0 gpm NO_x standard in conjunction with the Federal particulate standards. GM proposes that the final particulate rules be revised by exempting vehicles built for sale in California from the 1982 particulate standard in order to correct this alleged deficiency.

The language and legislative history of the Act give absolutely no indication that EPA must consider this technological feasibility of meeting California standards in establishing the appropriate stringency of Federal standards. In fact, it would be inconsistent with the statutory scheme to base Federal standards on such a consideration, since the end result would be that the stringency of the Federal standards would be dictated to some extent by the level of the California standards. Congress made provision in section 209(b) of the Act for the State of California to obtain a waiver of Federal preemption to enforce its own standards in order to permit that State to address its pervasive and acute air pollution problem.[2] This provision was designed to provide California with flexibility to deal with air pollution problems in the State; it was never intended to inhibit the ability of the Federal government to address national air pollution problems. As discussed more fully below, if compliance with both the California NO_x standard and the Federal diesel particulate standard is technologically infeasible, it is the California standard, and not the Federal standard, that must be reconsidered.

B. Creating an exemption for vehicles sold in California would be inappropriate.

There is no express authority in the Act to carry out GM's suggestion that the Agency exempt vehicles sold in California from the particulate standard. Indeed, the language and legislative history of the Act suggest that such an action would be inappropriate.

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[2] *See* H.R. Rep. No. 294, 95th Cong., 1st Sess. 302 (1977).

Congress clearly envisioned EPA promulgation of nationally uniform particulate emission standards. EPA is authorized under section 202(a)(3)(A)(iii) of the "National Emissions Standards Act", i.e., Title II of the Act, to prescribe regulations for particulate emissions from classes or categories of vehicles manufactured during and after model year 1981. For EPA to exempt California vehicles from the Federal particulate standards would be inconsistent with the statutory scheme under section 202(a)(3)(A)(iii), as well as with the concept of uniformity implied in the Federal preemption provision of section 209(a) of the Act.[3]

While it is possible for California to adopt a particulate standard different from the Federal standard, the State must determine first that its standards will be, in the aggregate, at least as protective of public health and welfare as the applicable Federal standards.[4] This requirement indicates that Congress intended for Federal standards to apply in California unless the State makes the protectiveness determination that Congress expressly left to California's judgment.[5] It would be inappropriate for the Federal government to substitute its judgment for that of California's by unilaterally removing the applicability of the Federal standard.

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[3] *See* S. Rep. No. 403, 90th Cong., 1st Sess. 33 (1967).

[4] Section 209(b) of the Act requires the Administrator to waive Federal preemption for California to enforce its standards unless he can find (1) that the State's protectiveness determination is arbitrary and capricious; (2) the State does not need such standards to meet compelling conditions; or (3) the State's standards are not technologically feasible.

[5] *See* H.R. Rept. No. 294, 95th Cong., 1st Sess. 301-302 (1977). Congress also directed the Administrator not to overturn California's judgment lightly, or to substitute his judgment for that of the State. *Id.* at 302.

C. EPA did not conclude in the particulate rule that NO_x waivers would be necessary in order to meet the Federal particulate standard.

In support of its request for revision of the particulate rules as they relate to California vehicles, GM argues that EPA presumed that the 1.0 gpm NO_x standard could be waived in order to allow compliance with the Federal 1982 particulate standard, and argues further that EPA concluded that it is not now feasible to meet "reasonable" particulate emission control requirements while at the same time meeting stringent NO_x control requirements such as the 1.0 gpm California standard. GM argues that since the least stringent NO_x standard allowed for 1982 California vehicles is 1.0 gpm, revision of the standards as they relate to California vehicles is necessary.

GM has mischaracterized EPA's conclusions regarding the feasibility of meeting the particulate standard. EPA did not find in the particulate rulemaking that a NO_x waiver was necessary to allow light-duty diesel (LDD) manufacturers to meet the particulate standard in 1982. EPA concluded that all manufacturers would be able to comply with a 0.6 gpm particulate standard in 1981 with currently available designs; however, because there was remaining insufficient certification leadtime, the standard would not be effective until 1982.[6] EPA based its findings on technological feasibility, in part, on the availability of the NO_x waiver for 1981—84 model year LDD's, in recognition of the upward pressure placed on particulate emissions by NO_x control technology.[7] However, because a NO_x waiver may be granted only if a manufacturer can show that it is unable to meet the applicable emission

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[6] "Regulatory analysis, Light-Duty Diesel Particulate Regulations," February 20, 1980 [hereinafter "Regulatory Analysis"], 38-41.

[7] *See* 45 Fed. Reg. 14496, 14497 (March 5, 1980).

standards in each model year unless the waiver is granted,[8] the availability of NO_x waivers is determined by a separate assessment of the technological feasibility of achieving those standards.[9]

EPA did not conclude that LDD manufacturers would need a NO_x waiver to meet the particulate standard, but only that if the need for a waiver were demonstrated, it would be available. As stated in the preamble to the particulate rulemaking, several manufacturers were unable to show that the NO_x waiver was necessary for certain engine families, and certain waiver requests had been denied.[10] In short, EPA did not assume that LDD manufacturers would need a NO_x waiver in order to meet the 1982 particulate standard.

D. Although reconsideration of the decision to waive Federal preemption would be appropriate if evidence were submitted to show that California's 1982 standards are technologically infeasible, no evidence has been presented, nor does such evidence exist in the particulate rulemaking record.

Although EPA has concluded not to reconsider the Federal particulate standard, as it properly was based on consideration of all Federal requirements, it is possible that,

[8] 42 U.S.C. 7521(b)(6)(B) (Supp. 1 1977); Diesel NO_x Waiver Guidelines, 43 Fed. Reg. 30341 (July 14, 1978); Diesel NO_x Waiver Consolidated Decision, 45 Fed. Reg. 5480 (January 23, 1980).

[9] Manufacturers must show a need for the NO_x waiver on the basis of the Monte Carlo analysis. *See* 43 Fed. Reg. 30341, 30343 (July 14, 1978).

[10] 45 Fed. Reg. 14496, 14497 (VW denied waiver request for the Audi due to presentation of insufficient data upon which to base a waiver determination, Regulatory Analysis at 41 (Peugeot denied NO_x waiver due to insufficient data); *see also* 45 Fed. Reg. 5480, 5487 (January 23, 1980) (GM, D-B, and Volvo denied waivers on similar grounds)). Upon reapplication, Volkswagen subsequently received waivers for its Rabbit, Dasher and Audi 500 engine families, and Peugeot received a waiver for one of its engine families, the XD2S family. *See* 45 Fed. Reg. 34718 (May 22, 1980).

under certain circumstances, the Administrator would reconsider his June 14, 1978, waiver decision regarding California's 1982 model year passenger car standards. The manufacturers bear the burden of demonstrating that conditions which would have warranted denial of California's waiver request presently exist as a result of subsequently adopted Federal requirements.[11] If manufacturers can show that there is insufficient lead time in which to develop the requisite technology to meet California's standards in conjunction with new Federal requirements, EPA may reconsider the waiver of Federal preemption for California to enforce its own standards.[12]

GM has suggested that I revoke the waiver of Federal preemption granted to California for its standards for model

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[11] A discussion of the manufacturers' burden of proof in California waiver proceedings is set out in several of the Administrator's decisions to waive Federal preemption for California to enforce standards and/or enforcement procedures. *See*, e.g., 42 Fed. Reg. 25755, 25756 (May 19, 1977); 43 Fed. Reg. 25729, 25734 (June 14, 1978). *See also Motor and Equipment Manufacturers Ass'n* v. *EPA*, _____ F.2d _____ (D.C. Cir., Aug. 3, 1979), *cert. denied*, _____ U.S. _____ (May 19, 1980).

[12] Even if the manufacturers can establish that some diesel engine families cannot meet the California NO_x standard, EPA is not necessarily required to vacate its earlier decision. If, on the basis of the record, EPA could not conclude that any limitation caused by the standards would cause basic market demand to go unsatisfied, then vacating the earlier decision would be inappropriate. In considering manufacturers' claims in the California waiver proceedings for 1979 and later model passenger car standards that the standards may result in a restricted vehicle offering incapable of meeting basic market demand in California, EPA could not conclude on the basis of the record that any limitation would in fact occur or that any such limitation would cause basic market demand not to be satisfied. *See* 43 Fed. Reg. 25729, 25734 (June 14, 1978). EPA also noted that the question of the applicability of *International Harvester* v. *Ruckelshaus* to a California waiver situation was set forth in a previous waiver decision published on October 7, 1976 (41 Fed. Reg. 44209, 44212). *See id.* at 25734, n. 101.

year 1982 light-duty diesel vehicles.[13] GM's statement that "revoking the waiver of Federal preemption is consistent with the requirements for granting that waiver since EPA is required to deny the waiver if the standards for which preemption is sought to be waived are not technologically feasible" is inaccurate. Under section 209(b) of the Act, I am required to grant waiver of Federal preemption unless the parties opposing the waiver convince me that the waiver request should be denied.[14] Thus, my technological feasibility determination in granting the June 14, 1978, waiver was based on manufacturers' inability to show that the requisite technology could not be developed within the remaining lead time, rather than an affirmative finding on the technological feasibility of California's standards.[15] Revoking the California waiver would not be appropriate unless the manufacturers were able to show that changed circumstances have rendered invalid my previous determination on the technological feasibility of California's standards, and that the State's 1982 standards are no longer technologically feasible when viewed in conjunction with applicable Federal requirements. GM has not made such a showing in the particulate rulemaking proceedings or in its petition for reconsideration.

GM's reliance on EPA's statements in the particulate rulemaking record is insufficient to show that California's 1.0 gpm NO_x standard is technologically infeasible in light of the 1982 Federal particulate standard. While EPA did conclude in its Regulatory Analysis that "NO_x control to 1.0 g/mi (0.62 g/km) is not feasible at this time with acceptable durability and particulate emissions control for *all engine families*"[16]

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[13] 43 Fed. Reg. 25729 (June 14, 1978).

[14] *See Motor Vehicle Manufacturers Association* v. *EPA*, _____ F. 2d _____ (D.C. Cir., August 3, 1979), *cert. denied*, _____ U.S. _____ (May 19, 1980).

[15] 43 Fed. Reg. 25729, 25734 (June 14, 1978).

[16] Regulatory Analysis, 33.

(emphasis added), this does not necessarily mean that vehicles intended for sale in California could not meet both California's 1982 standards and the Federal particulate standard. EPA's conclusion was made in the context of the lead time requirements and risk factors inherent in producing complying vehicles on a nationwide basis. Whereas it may be infeasible for all engine families to meet the particulate standard in conjunction with the statutory 1.0 gpm NO_x standard under nationwide production requirements, it is very possible that many — if not all — engine families can be produced for the more limited 1982 California market while meeting a 1.0 gpm NO_x standard.

This very distinction was made by one LDD manufacturer in its NO_x waiver application, in which it indicated that it planned to introduce in the 1982 California market LDD's meeting the California 1982 NO_x standard and the (then proposed) 0.6 gpm particulate standard.[17] In fact, EPA granted the 1982 NO_x waiver to GM and other applicants, in part, to allow them "to concentrate on emission control technology development, application and field assessment on a limited number of [1982 California] vehicles, and use these results for transfer to their Federal vehicles for model year 1983,"[18] EPA also concluded that there was no reason to believe that the technologies described by the applicants to achieve 1.0 gpm NO_x would not be available by 1982 in California.[19] Since GM has submitted no new evidence on this issue, there remains no reason to believe either that both standards cannot be met or that any limitation on LDD production in 1982 will occur.[20]

II. The 1985 Particulate Emission Standard

GM has contended that EPA's determination on the technological feasibility of the 1985 standards of 0.20 gpm for

[17] NO_x Waiver Application submitted by Daimler-Benz A. G., June 1979, I-3-4.

[18] 45 Fed. Reg. 5480, 5485, n. 81 (January 23, 1980).

[19] *Id.*

[20] *See supra* note 12.

passenger cars and 0.26 gpm for light-duty trucks does not reasonably satisfy the statutory criteria which require appropriate consideration of technological feasibility, lead time, cost, noise, energy and safety factors. In particular, GM has contended that any particulate standard which contemplates use of a regenerative trap-oxidizer must be judged premature, and that based on the evidence provided by GM and others for the rulemaking record, the 1985 particulate standards are not justified in relation to the statutory requirements.

However, as discussed more fully below, the rulemaking record clearly establishes the technological feasibility of the standards. EPA analyzed in detail the questions of lead time requirements, cost, noise, energy and safety in establishing the standards.[21] EPA's analysis included consideration of comments and data from the light-duty diesel manufacturer and others.[22] In particular, based upon all of the relevant evidence, EPA concluded that the after-treatment technology necessary for most manufacturers to meet the standards most likely could be incorporated into mass production by the 1984 model year.[23] Nevertheless, EPA provided an additional model year to reduce the economic risk inherent in applying new technology to a vehicle fleet.[24] Since the level of the particulate standards was based upon the lowest level of particulate emissions that could be expected from the highest emitting diesels, EPA determined that no light-duty diesels would be forced out of production as a result of the particulate rules.[25]

[21] *See* EPA, Summary and Analysis of Comments on the Notice of Proposed Rulemaking for the Control of Light-Duty Diesel Particulate Emissions from 1981 and Later Model Year Vehicles," October 1979 (hereinafter "Analysis of Comments"); 45 Fed. Reg. 14496-14504 (March 5, 1980).

[22] *See* id.

[23] Regulatory Analysis, 53; 45 Fed. Reg. 14496, 14498 (March 5, 1980).

[24] *Id.*

[25] *See* Analysis of Comments, 43.

As discussed below, since the basic technology is well understood, and adequate lead time has been provided to refine the technology and to allow for its application, there is no basis for GM's claim that EPA's determination is based on speculative analysis. EPA's determination was based, in part, on information and estimates provided by the industry and experts in the field, and GM has provided no new information to show why EPA's judgment is invalid. Since the rulemaking record supports the 1985 standard set by the Agency and GM has not presented any new information in its petition for reconsideration concerning the feasibility of that standard, reopening the rulemaking at this time would be totally inappropriate.[26]

A. The record fully supports EPA's determination that the needed technology can be successfully applied by 1985.

1. Passenger Car Standard.

GM argues that any particulate standard which contemplates the use of a regenerative trap-oxidizer must be judged premature and not technologically feasible. However, EPA did not base its technological feasibility determination wholly upon successful development of regenerative trap-oxidizers. First, EPA found that other measures expected to be taken by 1985, such as engine design modification, derating, turbo-charging and down-sizing are expected to reduce particulate emissions by 15-20 percent in even worst case vehicles, so that all light-duty diesels could meet a 0.50 gpm standard by 1984 or 1985 even without after-treatment.[27] Second, EPA's conclusion that after-treatment control would be required to meet the 0.20 gpm particulate standard in 1985[28] contemplated several technological alternatives. EPA

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[26] *See supra*, note 1.

[27] Regulatory Analysis, 46-47.

[28] Regulatory Analysis, 47; 45 Fed. Reg. 14496, 14497 (March 5, 1980) (Volkswagen's Rabbit was found not to require after-treatment).

explored the potential for application of three after-treatment devices currently being developed by the industry — catalytic converters, traps and trap-oxidizers.[29] Although EPA expected trap-oxidizers would be the preferred technology, simple exhaust traps with external restoration were found to be a feasible alternative particulate control technology if trap-oxidizers were rejected on technical or economic grounds.[30]

Although manufacturers are free to pursue any or all of these technologies in meeting the 1985 standard, GM has objected only to that portion of EPA's conclusion pertaining to trap-oxidizers. GM contends that there does not exist "a reasonable body of evidence to indicate that the basic necessary technology is known and that the remaining technological problems can be resolved in the time remaining before the standard becomes effective." To the extent that GM is referring to the evidence on development and application of trap-oxidizer technology, the record contains ample support for EPA's judgment that this technology can be used to meet the 1985 standard.

The record shows that the basic concept of the trap-oxidizer is well understood, and that the improvements necessary for successful application involve resolution of engineering problems rather than technological barriers.[31] Since resolution of those problems will depend primarily upon allocation of sufficient resources rather than scientific or technical breakthroughs, there is no factual support for GM's assertion that the "basic concept" is insufficiently developed on an experimental basis.[32]

With regard to each of the three critical issues on the feasibility of this technology — (1) collection efficiency, (2)

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[29] Regulatory Analysis, 47-49.

[30] *Id.*, 49 The use of simple exhaust traps has been explored for many years.

[31] *See* Regulatory Analysis, 50-53; *see* Analysis of Comments, 32-36.

[32] *See* 45 Fed. Reg. 14496, 14497-98 (March 5, 1980).

regeneration and (3) durability — EPA assessed the current state of development and evaluated the type of refinements necessary to successfully apply the technology.[33] Since the requisite collection efficiencies already have been demonstrated by several materials,[34] and several regeneration techniques have been used successfully for short-term tests, EPA concluded that the most critical issue is whether the efficiency and regeneration mechanism can be maintained over the useful life of the vehicle.[35]

EPA does not disagree with GM's observation that there have been no overall system demonstration tests over extended mileage;[36] however, the record does provide reasonable evidence of the potential for successful operation over extended mileage by the 1984 model year. For example, GM's own data, which GM claims EPA has relied on improperly to conclude that the technology can be successfully developed in time, provides a strong basis for concluding that there is the potential for successful regeneration initiation and control over extended mileage with acceptable collection efficiencies. Although GM's 1000-mile load up and incineration test was, according to GM, derived from an experimental system operated on a dynamometer at a simulated road load condition of only 45 mph and the regeneration events were manually controlled, the results did show that air intake throttling, as

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[33] *See* Regulatory Analysis, 46-53; 45 Fed. Reg. 14496, 14497-98 (March 5, 1980).

[34] EPA expects that trap collection efficiencies of approximately 67 percent will be feasible on trap oxidizers in the near future and the worst-case manufacturer is expected to need only a 60 percent reduction to meet the 1985 standard. *See* Regulatory Analysis, 48, 53.

[35] *See* Regulatory Analysis, 50-53; 45 Fed. Reg. 14496, 14497-98 (March 5, 1980).

[36] EPA stated that improvements must be made in the durability of the trapping material in the trap-oxidizer since it should last at least 100,000 miles. Regulatory Analysis, 51.

one regeneration technique, could be used on a repetitive basis while actually improving collection efficiency.[37] EPA did point out that further research on throttling is needed, and that further development of other systems that would be used as controller units in the regenerative process is necessary.[38] However, the type of development necessary involves manufacturers' choosing the exact trap-oxidizer design appropriate for their vehicles, since there is little question as to the mechanisms required for successful and durable operation.[39] EPA even set out several alternative trap-oxidizer designs capable of achieving the requisite particulate reductions with varying degrees of success, noting that the exact design may vary for each manufacturer.[40]

With regard to trap durability, EPA did rely on GM's Opel vehicle test as demonstrating the best trap durability reported to EPA, since the trap survived 12,800 miles with collection efficiency at that mileage similar to its zero-mile efficiency of 55 percent.[41] EPA did indicate, as cited by GM that "*as of this time,* no design has proven to have the required collection efficiency over the desired length of time." (Emphasis added.)[42] However, EPA also stated that it was convinced by the progress achieved to date, and the continuing research in the areas of regeneration and durability, that a successful trap oxidizer design could be developed within the next 1½ to 2 years.[43]

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[37] *See* Regulatory Analysis, 50. Air intake throttling is used to elevate the exhaust temperature to the requisite levels for incineration.

[38] *See id.* 50-51.

[39] *See* Regulatory Analysis, 50-53.

[40] *See* Analysis of Comments, 92-98; *see* Regulatory Analysis, 50-51.

[41] *See* Regulatory Analysis.

[42] *See id.*, 52.

[43] *See id.*

EPA's inability to cite successful overall system demonstration tests over extended mileage, which GM argues shows that experimental development has not progressed sufficiently, does not prevent EPA from concluding that the present state of the art can be improved sufficiently by 1985 to allow all manufacturers to comply with the 0.20 gpm standard. In fact, if the record reflected such successful demonstration tests, there would be no reason to provide for the 1½ to 2 years of design development lead time included in the final rules.

GM also argues that further development is needed in selection of materials with adequate trapping efficiency and durability, definition of the required trap size and configuration and other areas, and that "until further experimental knowledge on these major development needs is obtained, it is totally impossible to specify when a successful system will be developed for passenger cars and light-duty trucks." However, these are factors which each manufacturer must consider in choosing the appropriate design for its particular vehicles rather than areas in which generally applicable basic development is necessary. EPA has considered the lead time claimed to be needed by each manufacturer both to complete the development phase for a design change and to integrate the design change into mass production.[44] Thus, the need for manufacturers' development lead time to accomplish the design selection tasks cited by GM was considered. Based on the manufacturers' lead time estimates and EPA's own understanding of the lead time requirements for improvements necessary to apply the technology in-use, EPA concluded that there is a strong likelihood that trap-oxidizers will be feasible for vehicle application by the 1984 model year.[45]

EPA based its conclusion, in part, on GM's estimated lead time requirements,[46] and GM has not indicated why

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[44] *See id.*, 52-53.

[45] *See id.*, 53.

[46] *See id.*, 52.

EPA's projected rate of progress in trap-oxidizer development, given the types of improvements necessary, is unreasonable. Therefore, EPA's determination on the technological feasibility of the standards, which included lead time, cost and other factors, is supported by the record and totally consistent with the requirements of the Act.

2. *Light-Duty Truck Standard*

GM argued that EPA failed to make any specific assessment of the potential of this technology to perform successfully in light-duty truck operation. GM claims that EPA only modified the passenger car particulate standard to 0.26 gpm for light-duty trucks to account for the difference in expected uncontrolled emission rate, concluding that "EPA expects the very same technologies that will be used to meet the light-duty vehicle standards to be applicable to light-duty trucks." However, GM has given no indication of the basis for its objection to either EPA's comparison of light-duty truck technologies to those of light-duty vehicles, or EPA's modification to the passenger car standard to account for differences in emission-related factors.

EPA originally proposed that the light-duty truck particulate standards be equal to the light-duty vehicle standards since there was no data available to justify a separate truck standard.[47] It has been established in previous EPA rulemakings that manufacturers usually apply passenger car emission control technologies to light-duty trucks in order to comply with similar standards, since the engine configurations and type of use are very similar.[48] For instance, GM's diesel light-duty trucks utilize the same diesel engines that are used in the GM 4,500 pound light-duty vehicles.[49] Therefore, it was a

[47] *See id.*, 53-54; 44 Fed. Reg. 6650 (February 1, 1979) (notice of proposed rulemaking for diesel particulate standards).

[48] *See e.g.*, preamble to proposal to amend light-duty truck emission standards for 1978 and later model years, 41 Fed. Reg 6279 (February 12, 1976).

[49] *See* Regulatory Analysis, 58.

reasonable assumption that the same particulate control technology could be used to reduce the truck emissions as well.

However, data subsequently submitted in comments on the proposal convinced EPA that the increased inertia weight and road load settings of light-duty trucks required promulgation of a 1985 particulate standard that would be 20 percent greater than the corresponding light-duty vehicle standard.[50] EPA added a 10 percent particulate cushion for the trucks to account for less rapid downsizing and use of smaller engines expected to occur in passenger cars.[51] Therefore, EPA's adoption of a 1985 particulate standard for trucks which is 30 percent greater than the corresponding passenger car standard is reasonable in light of the evidence contained in the rulemaking record.

3. Cost And Other Considerations

GM contends that EPA's technological feasibility determination does not reasonably satisfy the statutory criteria which require appropriate consideration of technological feasibility, lead time, cost, noise, energy and safety factors. However, GM has made no reference to EPA's consideration of cost, noise, energy and safety factors other than claiming that EPA grossly underestimated the probable cost of applying a regenerative trap-oxidizer system, and therefore, that EPA's conclusion that the particulate standards are cost effective is invalid.

EPA is not required to find that the particulate standards are cost effective when compared to other particulate emissions controls,[52] but need only give appropriate consideration to the cost of developing and applying the requisite technology. EPA gave extensive consideration to the costs imposed by the regulations, by developing a methodology to provide a

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[50] *See id.*, 54-58.

[51] *See id.*, 58.

[52] *See* 45 Fed. Reg. 14496 14499 (March 5, 1980).

detailed analysis of the costs imposed on each segment of the industry, by considering and incorporating manufacturers' estimates, and by gathering independent estimates on the manufacturing costs of emission control equipment.[53]

GM's complaint that EPA's "underestimated" costs of the trap-oxidizer system appear to be based on earlier cost estimates made for catalytic converter technology applied to gasoline engines without any direct estimate of diesel emission control technology costs, is inaccurate. In order to calculate the fleetwide average costs, as well as the costs to both the largest and smallest manufacturers for the first five years of trap-oxidizer production, EPA calculated the cost of the various components which together form the trap-oxidizer system and applied its "revised retail cost methodology" to the estimates.[54] Since the primary cost of the system is derived from the trap itself, which no manufacturer has produced yet to provide a sample cost estimate, EPA approximated the trap cost from the current cost of a pelleted oxidation catalyst.[55] Neither GM nor any other manufacturer objected to this approximation in their comments on the proposal.[56] Nevertheless, EPA found from more recent information that the most promising trap designs were more similar to monolithic catalysts, and that in some cases actual monolithic substrates were being used for prototype trap testing. EPA's expert consultant developed a formula for determining the retail price equivalent of a trap from the cost of the monolithic catalyst,

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[53] *See* Analysis of Comments, 68-121.

[54] *See id.*, 83-98. EPA revised its original estimate of the cost per vehicle in applying the preferred after-treatment technology, trap-oxidizers, based on the component costs estimated by Leroy H. Lindgren in his study "Cost Estimation for Emission Control Related Components/Systems and Cost Methodology Description," (Rath and Strong for EPA), March 1978, EPA-460/3-78-002 (Hereinafter "Lindgren Study"].

[55] *See id.*, 83-84.

[56] *See id.*, 83.

and considered a range of possible trap designs and sizes, as well as other necessary components, to calculate the final cost range.[57]

In contrast to EPA's detailed cost analysis, GM's cost estimates, submitted to EPA during the comment period, were not supported by any data or analysis. GM's criticisms of several of EPA's specific component cost estimates, which were based primarily upon industry estimates, also were unsupported.[58] Therefore, EPA's cost estimates provided a reasonable basis for EPA's conclusions regarding the costs to be imposed on manufacturers and consumers as a result of the regulations.

B. The manufacturers' need for adequate lead time and certainty as to future emissions standards requires that EPA promulgate the 1985 model year standard at this time.

GM argues that any particulate standard that contemplates use of a regenerative trap-oxidizer must be judged premature and not technologically feasible, based upon its allegation that it is impossible to specify when a successful system will be developed for passenger cars and light-duty trucks. This argument is contrary not only to the technological evidence contained in the particulate rulemaking record, but also to the stated needs of GM and other diesel manufacturers regarding lead time and specific goals to be achieved through their development efforts.

In response to EPA questions on lead time requirements, GM stated that 2½ to 3 years production lead time would be required "after an acceptable method is defined."[59] Other manufacturers' production lead time estimates ranged from 1½ to 3 years.[60] However, since the time estimates were

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[57] Lindgren Study, 145.

[58] *See* Analysis of Comments, 68, 91-92.

[59] *See* Regulatory Analysis, 52-53.

[60] *See* id., 52.

forecast from the time an acceptable design is chosen, the controlling lead time factor is the extent to which the manufacturers aggressively pursue development of trap-oxidizer designs.

EPA found in the particulate rule that:

> Particulate emissions are a classic economic externality for the automotive industry. . . . Experience has shown the greatest emission control development work to have taken place when direct regulatory incentives were in place.[61]

Since the rate of industry development of acceptable trap-oxidizer designs is primarily a function of the regulatory requirements established for future model years. GM's assertion that "it is impossible to specify when a successful system will be developed" ignores the disincentive created by the marketplace for development and application of trap-oxidizer systems. Therefore, EPA's current promulgation of the 1985 standard operates to "encourage a feasible strategy that might otherwise be ignored", by providing the necessary incentive for selection of acceptable designs.[62] Based upon information and statements submitted by the manufacturers, EPA established a reasonable time frame of 2-2½ years for completion of the design development phase, and added 2-2½ years of production lead time for compliance with the 0.20 gpm standard.[63] This provides ample opportunity for manufacturers to "improve, test and apply" the technology before the effective date of the standard.[64]

EPA's promulgation of long-range target emission standards addresses not only the manufacturers' estimates of pro-

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[61] 45 Fed Reg. 14496, 14498 (March 5, 1980).

[62] *Id.*

[63] *Id.; See* Regulatory Analysis, 52-53.

[64] *Cf. International Harvester Co.* v. *EPA*, 48 F.2d 615, 628-629.

duction lead time requirements,[65] but also the expressed need for certainty regarding the specific emissions control goals to be achieved in each model year. For example, in EPA proceedings on GM's request for waiver of the statutory 1.0 gpm NO_x standard under Section 202(b)(6)(B) of the Act, GM indicated that a major constraint on its ability to focus on development of the requisite technology to meet a 1.0 gpm NO_x standard was that it did not know what the standards were to be in the Federal program.[66] GM specifically cited the particulate standards as a constraint in its uncertainty regarding the "targets that [GM] is designing for."[67] GM's reference to the uncertainty created by unknown design targets and its specific reference to the proposed particulate standard support EPA's early promulgation of the 1985 model year 0.20 gpm particulate standard.

C. Compliance with other emission standards will not prevent successful application of the after-treatment technology in 1985.

GM argues that "[t]ime required to resolve the successful application of this experimental concept is further complicated by sequentially more severe emission standards which are scheduled to apply to light-duty diesel vehicles over the next few years." GM stated, "in the passenger car case, new emission standards occur each year which require significant development effort," and specifically cited, along with the 1985 particulate standard, the 1.0 gpm NO_x standard which

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[65] In their comments on EPA's projection that trap-oxidizers could be a viable technology by the 1983 model year, Volkswagen stated that the earliest possible introduction date for trap-oxidizers is the 1985 model year, and GM indicated that, based on the current status of its trap-oxidizer program, there was a possibility of 1985 model year introduction. *See* Analysis of Comments, 40-41.

[66] *See* Transcript of Proceedings in the matter of No_x Diesel Waiver Hearing, Volume 2, June 19, 1979 [hereinafter "June 19, 1979, NO_x Transcript"], 113-117.

[67] *Id.*, 114.

must be met in California in 1982 and nationwide in 1983, is diminishing its ability to concentrate on the long term need to simultaneously lower NO_x and particulate emissions.

GM's argument is without merit, since the long term goal of reducing both NO_x and particulate emissions is being made possible through the gradual phase in of more advanced technologies necessary to meet the increasingly stringent standards. Although Congress mandated that all light-duty vehicles meet a 1.0 gmp NO_x standard nationwide in 1981,[68] EPA has waived that standard for certain 1981-82 diesel engine families under the section 202(b)(6)(B) diesel NO_x waiver provision.[69] For the 1982 model year, EPA took into account the risks inherent in applying the more advanced NO_x control technology on a national scale as well as the fact that the manufacturers would be required to apply that technology at least on a limited scale in 1982 California diesel cars to meet its 1.0 gpm NO_x standard.[70] Therefore, the "increasingly stringent" NO_x requirements cited by GM are merely the result of EPA's efforts to allow the diesel manufacturers to gain limited production and in-use experience before applying the 1981 Federal NO_x standard to diesel passenger cars.

Furthermore, EPA considered the applicability of the 1.0 gpm NO_x standard in its promulgation of the 0.2 gpm particulate standard for the 1985 model year. EPA concluded that the NO_x-particulate trade-off which results from currently available NO_x control technology will decrease as the relationship becomes better understood, and that other NO_x control

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[68] U.S.C. 7521(b)(1)(B)(Supp. 1977).

[69] 45 Fed. Reg. 5480 (January 23, 1980); 45 Fed. Reg. 34718 (May 22, 1980).

[70] *See*, e.g., 45 Fed. Reg. 5480, 5485-5487 (January 23, 1980). It should be noted that California's 1982 model passenger car standards have been in place since June 14, 1978.

techniques which will not necessarily increase particulates, and may even reduce them, will be implemented.[71]

D. GM's request for reconsideration and withdrawal of the 1975 particulate standard is premature.

Since GM is unable to support its assertions regarding EPA's technological feasibility determination, it would be premature for EPA to reconsider the 1985 particulate rules at this time. No evidence has been presented to show that the necessary technology will not be available by the time it is needed, and that compliance with the standards will present unreasonable cost, safety, energy, or other problems.

If, notwithstanding the evidence in the record, the time frame provided for completion of the development phase proves, at a later time, to be inadequate, additional time could be provided and the standards revised accordingly. Since the decision whether to provide more lead time to complete the development phase and whether to revise the standard would be made well in advance of the effective date of the standard, the likelihood that any manufacturer would be harmed by such revision is significantly reduced.[72]

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[71] *See* Regulatory Analysis, 53, 45 Fed. Reg. 14496, 14498 (March 5, 1980). One such technique is intake throttling, which GM has used in its development efforts to meet the 1.0 gpm NO_x standard and which, according to GM, reduces both NO_x and particulates. *See* June 19, 1979. No_x Transcript, 170-171.

[72] *Cf. International Harvester Co.* v. *EPA*, 478 F.2d 615 (D.C. Cir. 1973), where the Court indicated that a "wrong decision" on technological feasibility could not be remedied by a relaxation of the standards at a later hour due to the likely detrimental impact to manufacturers who tooled up to meet a higher standard than would ultimately be required. 478 F.2d at 637-638. The present situation is readily distinguishable from that described in *International Harvester* because there, the decision to relax the standards would have occurred after the production sequence was set in motion, whereas the 1985 particulate standard would be revised several years prior to the effective date.

III. Hydrocarbon Measurement Technique

GM has requested that the diesel exhaust hydrocarbon measurement technique be revised substantially to measure only those hydrocarbons that are gaseous behind a filter at 125°F. This request is based on GM's contention that EPA's measurement technique incorrectly measures hydrocarbon exhaust by including hydrocarbons that allegedly do not contribute to atmospheric formation of photochemical oxidants. GM contends that hydrocarbons adsorbed on the particulates do not engage in atmospheric chemistry reactions, and cited data submitted as part of comments on the proposed rulemaking which allegedly confirm its statement that adsorbed hydrocarbons "are not part of the exhaust HC (gaseous) concern for oxidant formation." GM has proposed that the HC measurement technique be revised to utilize the particulate measurement filter, which operates near ambient conditions, as the separator of gaseous and particulate emissions. GM claims that this change to the measurement technique should be made immediately since GM's data shows a difference in measured HC levels of 38 percent.

That portion of the test procedure which GM is objecting to — the use of a heated exhaust gas sampling system for purposes of measuring HC emissions — was raised previously by GM during the comment period on the proposed particulate rule.[73] EPA chose to retain the "heated" hydrocarbon sampling system, which continued EPA's preexisting practice of heating diesel gas streams to prevent condensation of the diesel HC, thereby assuring measurement of all hydrocarbons.[74] GM has presented no new data or information to support its request for reconsideration of EPA's decision to retain the "heated" HC measurement method. EPA already has considered GM's arguments and data on the reactivity of cer-

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[73] *See* "General Motors Response to EPA Notice of Proposed Rulemaking on Particulate Regulation for Light-Duty Diesel Vehicles," April 19, 1979 [hereinafter "GM Comments"].

[74] *See* 45 Fed. Reg. 14496, 14505 (March 5, 1980).

tain hydrocarbons during the rulemaking process, and has concluded that (1) GM's data were based on unrealistic tests, and (2) in any event, the stringency of the particulate rule is not affected by the HC measurement method.[75].

GM has not claimed that the test procedure, as modified, has imposed any new requirement with regard to compliance with the HC standard, or that this procedure affects its ability to comply with the particulate standards.[76] Rather, GM is objecting to EPA's continued measurement of all hydrocarbons for purposes of compliance with the statutory HC standard. Although EPA questions the appropriateness of GM's requesting such a change in the HC measurement technique in the context of the particulate rulemaking, we have set out below the reasons for denying GM's request.

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[75] 45 Fed. Reg. 14496, 14504 (March 4, 1980); *see* Analysis of Comments, Chapter III.

[76] GM has asserted that development of the particulate emission measurement technique has renewed its concern that EPA has used heated sample system lines to measure diesel exhaust HC "without proper consideration of whether the hydrocarbons being measured would be gaseous (volatile at ambient conditions)" in terms of whether a portion of the exhaust hydrocarbon emissions was adsorbed on the exhaust particulate. However, EPA's modification to the test does not affect manufacturers' ability to comply with either the HC or the particulate standard. As discussed in the text below, EPA is authorized under section 202(b) to regulate total HC emissions, and need not make an affirmative finding that the measured HC would be reactive or contribute to air pollution. Measurement of exhaust HC properly is based on the presence in the exhaust of any HC, whether it is adsorbed on the particulate and regardless of whether it remains adsorbed in the atmosphere. In addition, whether a portion of the exhaust HC is adsorbed on particulates or is volatile at ambient conditions has not affected the stringency of the particulate standard, since the numerical stringency has been based on an assumption that the baseline particulate emission level was measured with hydrocarbons adsorbed onto the particulate at the lower particulate filter temperature. *See* 45 Fed. Reg. 14496, 14504 (March 5, 1980).

A. In enacting section 202(b) of the Act, Congress intended to regulate hydrocarbon emissions on the basis of total hydrocarbon exhaust.

GM has requested that EPA use the particulate measurement filter, which operates at 125°F, in measuring diesel exhaust HC emissions, in order to exclude from the measurement those hydrocarbons GM claims to be photochemically unreactive.

Such a suggestion is contrary to the intent of Congress in enacting the 1977 Amendments. As the United States Court of Appeals for the District of Columbia Circuit recognized in *Ford Motor Co.* v. *EPA*, — F.2d — [July 2, 1979), in enacting section 202(b) of the Act, Congress intended to limit HC emissions based on measurement of all hydrocarbons.[77] The Court upheld the hydrocarbon standard promulgated by EPA for 1980 and later model year gasoline and diesel light-duty vehicles, which was based on the measurement of all hydrocarbons, including such nonreactive hydrocarbons as methane.[78]

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[77] Under the mandate of section 6 of the Clean Air Act Amendments of 1970, Pub. L. 90-604, 84 Stat. 1690, EPA promulgated numerical values representing 1970 model year baseline levels. 36 Fed. Reg. 12657 (July 2, 1971). The HC standard that was applicable to 1970 vehicles and referenced in the 1970 Amendments was based on measurement of all HC. *See* 33 Fed. Reg. 8304 (June 4, 1978). The numerical value of 0.41 gpm arrived at by EPA was referenced explicitly by Congress in the 1977 Amendments to the Act. *See* S. Rep. No. 127, 95th Cong., 1st. Sess. 68 (1977).

[78] See 44 Fed. Reg. 20086 (1979) ("EPA scientists believe methane is photochemically unreactive and does not contribute to the formation of photochemical smog.") 43 Fed. Reg. 43303 (1978), codified at 40 C.F.R. §86.080-8(a)(1)(i) (1980) HC standard); 43 Fed. Reg. 37972-73 (1978), codified at 40 C.F.R. §86.081-8(a)(1)(I) (1981 HC standard); 44 Fed. Reg. 20086 (1979) (denial of Ford Motor Company petition for reconsideration of hydrocarbon exhaust emission standards which included methane, a nonreactive hydrocarbon).

The language and legislative history of the Act indicate that Congress intended the HC emissions standard to be applied to diesel powered light-duty vehicles no differently from application of the standard to gasoline vehicles under section 202(b). Under that section, *all* light duty vehicles are required to meet the specified percentage reduction in HC emissions from the baseline model year, which EPA has determined to be 0.41 gpm.[79] Congress explicitly referenced the 0.41 gpm standard when it amended the Act in 1977, implicitly recognizing EPA's determination of the numerical value on the basis of total HC emissions, and EPA's application of the numerical total HC standard to diesel powered light-duty vehicles as well as gasoline vehicles.[80]

Congress also explicitly referenced in the 1977 Amendments the "current test procedure" used by EPA to measure vehicle emissions.[81] At that time, EPA heated the diesel HC exhaust gas samples to determine compliance with the HC standard, for the specific purpose of measuring all the HC in the diesel exhaust.[82] Since diesel exhaust is cooler than gasoline vehicle exhaust, EPA found that extremely low diesel

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[79] *See* 36 Fed. Reg. 1265 (July 2, 1971). Congress considered the ability of diesel powered light-duty vehicles to meet the 0.41 HC standard and other applicable standards, indicating its intention that diesels be subject to the same requirements under section 202(b) as gasoline vehicles. *See, e.g.* H.R. Rep. No. 294, 95th Cong., 1st Sess. 245-251 (1977). The same HC measurement techniques have been applied to diesel powered light-duty trucks, and there is no indication that Congress intended light-duty trucks to be treated differently from passenger cars for purposes of compliance with total HC standards applicable to both classes of vehicles. In fact, Congress has stated that light-duty trucks "should not be regulated any less stringently than automobiles." S. Rep. No. 127, 95th Cong., 1st Sess. 66 (1977).

[80] *See* S. Rep. No. 127, 95th Cong., 1st Sess. 68 (1977).

[81] *Id.*

[82]

HC measurements would be obtained by using the procedure used to measure gasoline vehicle HC emissions. As a result, EPA regulations required, and continue to require, the exhaust sampling line and filter to be heated to prevent condensation of the HC and ensure its inclusion in the test results.[83]

If Congress had intended that EPA exclude "non-gaseous" HC from the standard for diesel powered light-duty vehicles by changing either the measuring technique or the applicable numerical standard, it would have expressly provided for separate treatment of diesels, as was done with regard to the statutory NO_x standards.[84]

As is discussed in more detail below, adoption of GM's proposal could reduce significantly the stringency of the HC standard. Such a result would provide a windfall to manufacturers of diesel vehicles and would thus be contrary to the intent of Congress in mandating a 90 percent reduction in HC emissions effective with the 1981 model year.

B. EPA has not changed the stringency of the HC standard in modifying the exhaust HC measurement technique to incorporate measurement of particulate emissions, whereas GM's proposed modification would affect the stringency of the HC standard.

GM claimed that HC emissions test results are 38 percent lower under GM's proposed modification as compared to the current procedure. Since the stringency of the HC standard is a function of the measurement technique used, and EPA's

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[83] *See* 45 Fed. Reg. 14496, 14516 (March 5, 1980), codified at 40 C.F.R. §86.121-82 (1982 test procedure-hydrocarbon analyzer calibration;) *see supra*, note 82.

[84] Congress recognized the difficulty that some diesel models would have in meeting the same NO_x standard that gasoline vehicles were required to meet in 1981, and included a provision for EPA waiver of the NO_x standard for up to four model years for those light-duty diesels which demonstrated a need for the waiver. *See* section 202(b)(6)(B) of the Act.

technique does not differ in any material respect from the former procedure, GM's proposal conceivably could reduce the stringency of the HC standard by 38 percent.

In order to incorporate particulate measurement in the emissions testing procedure, EPA modified the test procedure to substitute use of a dilution tunnel for the mixing box used in the previously applicable procedure. In addition, the filter used in the HC measurement to screen out particulates was to be heated to 375°F ± 20°F, a slightly narrower temperature range than previously in effect.[85] EPA conducted tests in which gaseous emissions results from both old and new procedures were compared, and EPA concluded that the results using the new procedure were not significantly different.[86] Therefore, the stringency of the statutory HC standard was not significantly affected by the modification.

On the other hand, GM's proposal to reduce the temperature of the exhaust gas sample to 125°F for purposes of measuring HC by using the particulate measurement filter would reduce the stringency of the HC standard. This would result from exclusion of hydrocarbons that are gaseous at the higher temperatures that were used to measure diesel HC emissions at the time Congress affirmed EPA's test procedures and total HC standard. Assuming that GM's claim that there is a 38 percent difference in the measured HC as a result of using the cooler particulate filter is correct, there would be a significant reduction in the stringency of the HC standard as applied to diesel vehicles.

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[85] *See supra,* note 83.

[86] EPA Technical Report No. SDSB 79-04, "Light-Duty Diesel Gaseous Emissions Measurement — Comparison of Dilution Tunnel Test Results to Certification Cell Test Results," January 1979.

C. Even if EPA were authorized to exclude from the HC measurement hydrocarbons that are adsorbed to the exhaust particulate, the rulemaking record does not show that the adsorbed HC does not participate in photochemical reactions.

GM has asserted that the particulate rulemaking shows clearly that the hydrocarbon adsorbed to the exhaust particulate should not be considered or measured as gaseous HC emissions since they are and remain a particulate emission and do not react as a gas to form photochemical oxidant. As discussed above, EPA is not required to consider the volatility of diesel hydrocarbons in order to measure them for purposes of compliance with the total hydrocarbon standard. Furthermore, even if EPA had chosen to reexamine the HC measurement technique, currently available evidence would not enable EPA to conclude that adsorbed hydrocarbon would not participate in atmospheric chemical reactions that result in photochemical smog formation.

In support of its conclusion that the adsorbed organics "are not a part of the exhaust HC (gaseous) concern for oxidant formation," GM referred to data submitted in its comments on EPA's proposed particulate rules.[87] Although GM claims that this data showed that the adsorbed organics remain adsorbed on the particulate after months of ambient exposure, EPA concluded that GM's testing did not simulate real atmospheric conditions, and therefore would not exhibit data which is representative of the reactivity of the hydrocarbons under real world conditions.[88] For instance, whereas GM used filters with the particulate matter tightly packed on the filter surface in testing the volatility of the organics, in the real world the particulates are dispersed in the atmosphere and exposed to extreme atmospheric conditions, such as intense sunlight, turbulence, chemical interactions, temperature

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[87] GM Comments, Attachment E.

[88] Analysis of Comments, 132; 45 Fed. Reg. 14496, 14504 (March 5, 1980).

and humidity changes, which may play a primary role in the volatility of the hydrocarbons. In particular, when the particle-bound hydrocarbons ar exposed to real atmospheric conditions for long periods of time, there is the possibility not only that they disassociate from the particulate to become reactive, but also that they participate in photochemical reactions regardless of their proximity to the particulate.[89] Thus, EPA concluded in the particulate rule that "it believes that particulate related hydrocarbons could interact in the atmosphere both in the formation of oxidant and as particulate matter."[90]

EPA's conclusion is consistent with advice received from EPA's expert consultant on this issue, which GM claims to have been ignored by EPA. In addition to the characterization of the issue treated, as cited by GM, that "the currently in-use procedure requiring sampling at about 380°F, measures organics that are not volatile enough to react in gas phase and, hence, yield measurement results that are erroneously high with respect to the oxidant problem," the conclusion reached was that:

> It is extremely unlikely that a significant portion of the diesel organic emissions will turn out to be totally unreactive and, hence, exemptable from emission standard or tradeoff considerations.[91]

This conclusion reflects the need for reliable bases for identifying those organics that have no bearing on the oxidant/ozone problem.[92] EPA's treatment of organic com-

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[89] *See* EPA, "Air Quality Criteria for Ozone and Other Photochemical Oxidants," Vol. I, April 1978, EPA-600/8-78-004 [hereinafter "Ozone Criteria Document"] pp. 5-45 to 5-58.

[90] 45 Fed. Reg. 14496, 14504 (March 5, 1980).

[91] Memorandum from Basil Dimitriades, Acting Director, Atmospheric Chemistry and Physics Division, EPA, to A.P. Altshuller, Director, Environmental Sciences Research Laboratory, 2 (June 3, 1977).

[92] *See* Ozone Criteria Document, 5-58.

pounds for purposes of State's compliance with the National Ambient Air Quality Standards for photochemical oxidants, which is based, in part, upon EPA's conclusion that available evidence shows that very few organic compounds are of such low photochemical reactivity that they can be ignored in oxidant control programs,[93] also supports EPA's position regarding particle-bound organics.

Therefore, neither the evidence contained in the rulemaking record nor GM's data and conclusions regarding particle-bound hydrocarbons, provide a sufficient basis for EPA to modify its total hydrocarbon measurement technique, even assuming that EPA could do so.

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[93] *See* 40 CFR Part 51, Appendix B (guidance to States in preparation, adoption and submittal of State Implementation Plans); *see* 42 Fed. Reg. 35314 (July 8, 1977) (recommended policy on control of volatile organic compounds), where EPA stated that "even compounds that are presently known to have low reactivity can form appreciable amounts of oxidant under multiday stagnation conditions such as occur during summer in many areas."

1. Study Of The 1985 Light-Duty Diesel Particulate Standards.

On March 5, 1980, EPA published regulations governing emissions of particulate matter from diesel-powered light-duty vehicles and light-duty trucks (45 FR 14496). These regulations set 1982 standards of 0.6 gpm for both vehicle categories and 1985 standards of 0.2 gpm for diesel light-duty vehicles and 0.26 gpm for diesel light-duty trucks. The 1985 standards were based upon an analysis of the best technology believed to be available for use by that time. Specifically, EPA projected that trap oxidizers, and aftertreatment technology, could be successfully developed for 1985 model year application and the final standards were developed from that projection. EPA acknowledged the technology forcing nature of those standards at the time of promulgation and their dependence upon the successful development of trap oxidizers for light-duty diesels, pointing out that the standards would be revised if it appeared that manufacturers were not making the progress that EPA had predicted. In upholding the standards on judicial review, the U.S. Court of Appeals for the District of Columbia Circuit recently agreed with EPA's view that there is sufficient time remaining to permit modification of the standards if the expected pace of development does not occur. *NRDC* v. *EPA*, No. 80-1312 (D.C. Cir. April 22, 1981).

This study will reexamine the technological feasibility of the final particulate standards for light-duty diesel vehicles and light-duty diesel trucks by updating the earlier feasibility analysis with information on progress made by both vehicle manufacturers and independent suppliers in the development of trap-oxidizer technology. EPA expects to complete this review before the time when major capital investments would have to be made by the industry to comply with the standards.

The study will be conducted in light of the April 16, 1981, announcement that EPA will propose by September 1981 diesel particulate emission averaging schemes to replace the individual-vehicle standards now in place for 1985. Averaging will provide flexibility to the diesel manufacturers in allowing them to comply with the 1985 standards by allocating particulate control technologies among their diesel models in the most cost-effective manner.

In connection with this study, EPA requests informaton on the following specific areas:

a. What filter materials and designs have been evaluated thus far, and what are the advantages and disadvantages of each?

b. What are the particulate collection efficiencies and backpressure levels associated with the various trap materials, both at zero-mile levels and at various levels of mileage accumulation (without external regeneration)?

c. What durability levels (i.e., mileage) have been achieved with each of the various trap materials, with either external or on-board regeneration?

d. What exhaust gas temperatures are required for regeneration of the various trap designs? How do these temperatures compare to the exhaust temperatures of the diesel vehicles for which the trap-oxidizers are being designed?

e. How closely do the trap collection efficiencies and backpressure levels return to zero-mile levels after one regeneration, several regenerations, and hundreds of regenerations?

f. How far can the vehicle be driven between regenerations? Is there a critical range of loading such that the trap must undergo regeneration in that range or result in trap deterioration or destruction? If so, are there control devices or other ways to bring about regeneration within that narrow range?

g. What methods have been evaluated for the initiation and control of on-board trap-oxidizer regeneration? What are

the advantages and disadvantages of each of the control systems?

h. What are the highest temperatures reached during trap regeneration? How long does regeneration take? Is driveability affected when regeneration occurs?

i. What parameters have been of most importance in determining the optimum frequency of on-board regeneration?

j. Does the trap-oxidizer have any effect on fuel consumption?

k. What are the HC, CO, NO_x, and particulate emission profiles during trap regeneration?

l. What are the measured sulfate levels for the various trap designs?

m. Does the trap remove or eliminate other emissions such as CO and organics? If organics are removed, which classes of organics are removed or eliminated? Does the location of the trap in the exhaust system affect the removal/elimination of the organics or other emissions?

n. Have any bioassay tests been performed on particulate emissions collected during trap operation? Does the trap have any effect on measured biological activity?

o. Have the optimum trap volumes been determined for the vehicles for which the trap-oxidizers are being designed?

p. Where in the exhaust system will trap-oxidizers most likely be placed?

q. Do you foresee any safety problems with trap-oxidizer operation?

r. What is your current overall evaluation of the trap-oxidizer, and what, if any, technical improvements are still necessary?

s. What is your best estimate of the additional time necessary, if any, to optimize a trap-oxidizer design and when could it be integrated into vehicle production?

t. What is your best estimate of the cost of the trap-oxidizer?

u. Have you done any work in the development of control techniques other than trap-oxidizers?

General Motors Response to

EPA NOTICE OF PROPOSED RULEMAKING ON PARTICULATE REGULATION FOR LIGHT-DUTY DIESEL VEHICLES

Submitted to:

Environmental Protection Agency

April 19, 1979

TRAP MATERIALS COMPANIES

AC	ICI Amer.
Burlington	International Steel Wool
Carborundum	James River
DuPont	Metex
Engelhard	Mitsubishi
Granlin	Purex
GMR	Texaco
Hoskins	The Catalyst Co.

Paper Element Tests: High surface area pleated paper filter elements have given about 80% particulate reduction on the FTP cycle. However, they have short mileage capacity and the materials are destroyed by incineration under some driving conditions.

Figures V-3 and V-4 show Opel and Oldsmobile data with one and two paper cartridges respectively. Each of these cartridges has about 3 gallons in total volume with 5,000 square inches of particulate collection surface. It can be seen that with 700 miles of FTP type schedule driving the backpressure on the Oldsmobile has risen to 80 in. H_20 from the 20 in. H_20 of a standard exhaust system at 40 mph. At this point, the paper element ruptured. A water heat exchanger was used ahead of the Opel filter test to cool the exhaust and had some effect on backpressure characteristics. The Opel also loaded up in 700 miles and in some cases the paper element caught fire and was destroyed.

Exploratory R & D is continuing on this filtration approach to particulate collection with emphasis on developing high temperature materials and high volume utilization.

Trap Materials: A trap material has a fairly open structure which will trap or collect particulate within the body or structure. Traps cannot normally block the exhaust system. They may have the highest collection capacity for a specific volume.

The ceramics or ceramic coated metals have usually shown better collection characteristics than bare metals. However, satisfactory durability of ceramics has not been demonstrated. Work is in progress on ceramic coated metal mesh, ceramic beads, knitted ceramic cloth, and bare metal mesh.

Figures V-5, -6, -7, -8, -9 show a number of the best materials tested on the Opel 2100D (2.1 liter) and Olds 5.7 liter diesel engines at simulated road load operation.

Figure V-12 shows modified AMA schedule durability data obtained with a metal mesh trap on an Opel vehicle. This was a non-typical driving schedule with no hard accelerations, hills, or speeds above 45 mph. The material did survive 12,000 miles with some attrition; however, there was evidence of particulate blow-off and self incineration even at these low load conditions.

Figure V-13 shows low mileage FTP data from an attempt to tailor a pre-1980 Oldsmobile 350 with a metal mesh type trap having a catalyst coating. It shows 46% particulate collection and 36% less HC with the trap alone; and, with the injection retarded, 16% lower NO_x and a net of 58% particulate collection but loss of the HC benefit. Significant economy and performance penalties also resulted.

Road testing indicated that blow-off of collected particulates from this material can occur under some driving conditions. Figure V-14 shows that slow speed driving of 50 miles at 40 mph before an FTP cycle increased the particulate emissions on this car from .25 to .31. This is apparently caused by

blow-off of stored matter on the trap since the 1-5 cycles cold portion of the FTP increased from .43 to .60 gm/mile. Similar results were indicated by tailpipe smoke reading on W.O.T. accelerations after slow driving.

EGR was added next in the test series of Figure V-13, This brought the NO_x down to about 1.0 gm/mile but the particulates went nearly back to the original level without a trap or injection retard. Even a second large trap could not bring the particulates down on this combination, and sufficient load-up occurred in about 200 miles of driving, that the unit caught fire and was destroyed as shown in Figure V-15.

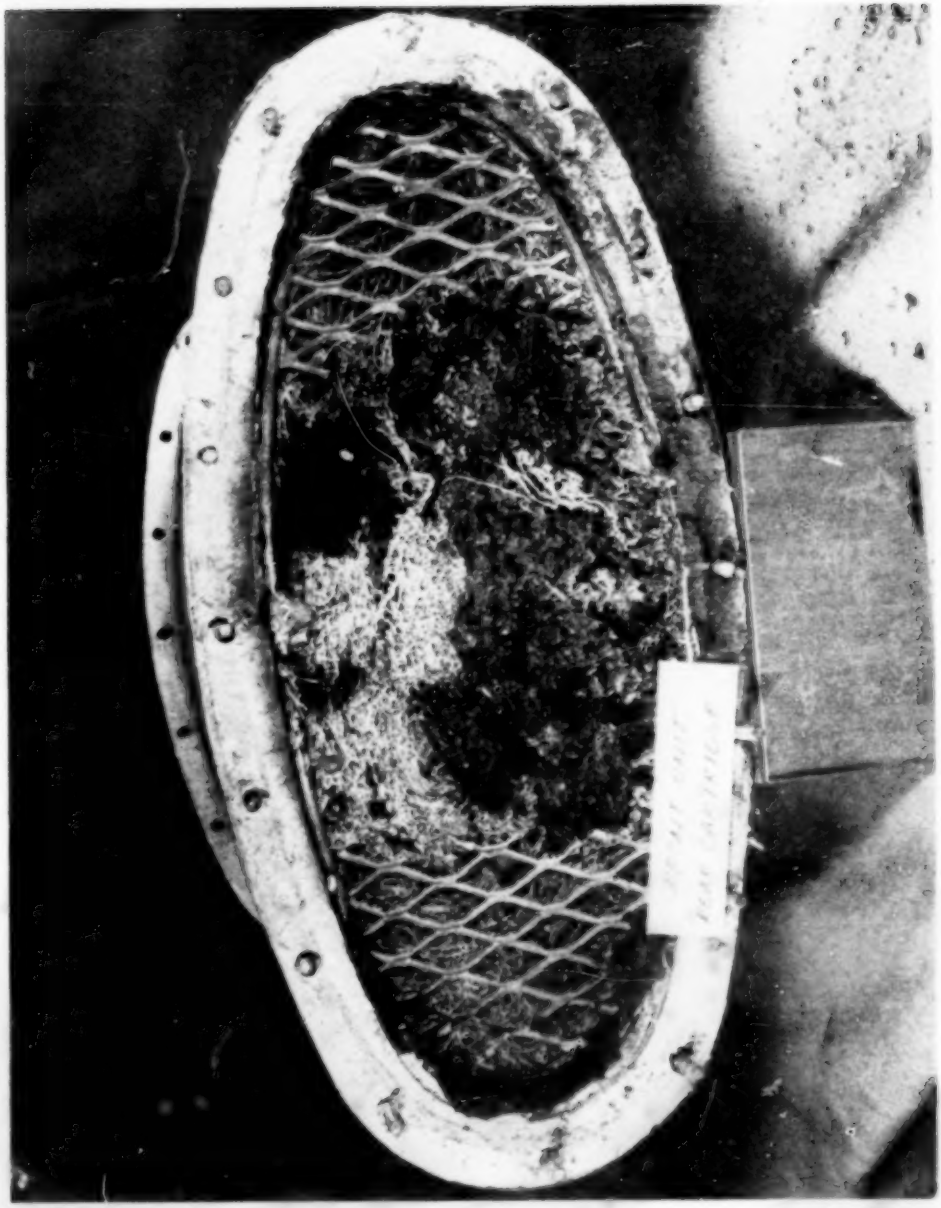
A material more resistant to incineration must be developed before this program of trap to vehicle tailoring can be continued.

Trap Servicing and Regeneration

The measured bulk density of particulates removed from the walls of an exhaust system or CVS tunnel is in the range of 0.07 — 0.10 gm/cm³. At this low density for typical emission levels the particulate volume removed by an efficient trap may be well over a gallon per thousand miles. This particulate bulk is not distributed evenly through the trap material but is concentrated more heavily near the trap inlet. For these reasons, traps of reasonable volume have capacity for only a few hundred miles of operation. Some sort of periodic regeneration procedure would appear to be required to remove accumulated particulate and thereby reduce backpressure, prevent particulate blow-off, and restore normal trap efficiency.

Both trap servicing, for example at the time of refueling, and automatic regeneration on the vehicle are being considered.

Trap Servicing: A study is in progress to evaluate various cleaning methods for trap restoration by servicing with external (not on-board) equipment. It is recognized that such methods would require***.



Regulatory Analysis

Light-Duty Diesel Particulate Regulations

Environmental Protection Agency
Office of Air, Noise, and Radiation
Mobile Source Air Pollution Control

Approved by:

/s/ MICHAEL P. WALSH
Michael P. Walsh
Deputy Assistant Administrator for Mobile Source Air Pollution Control

Date: February 20, 1980

C. Light-Duty Diesel Characterization and Industry Description

The particulate regulations being promulgated apply to two classes of diesel-powered vehicles. The first class consists of diesel-powered light-duty vehicles (LDV-D), which are defined as passenger cars or passenger car derivatives capable of seating 12 persons or less. The second class is the diesel-powered light-duty truck (LDT-D) class, which consists of vehicles rated at 8,500 pounds (3,546 kg) gross vehicle weight rating (GVWR) or less designed primarily for transportation of property or for transportation of more than 12 passengers. While LDT-D's are designed for periodic carrying of cargo, these vehicles are used most often in ways more analogous to passenger cars than to cargo-carrying trucks.

Currently, only about 0.5 percent of all light-duty vehicles are powered by diesel engines. Over the next 10 years, the use of diesel engines in light-duty vehicles is expected to increase dramatically. Current projections foresee as many as 25 percent diesels in these markets by 1990. Two maximum penetrations of 15 percent and 25 percent were used for determining the range of environmental and economic impacts described below.

The primary manufacturers of these vehicles, both gasoline and diesel-fueled, produce vehicles in both classes. The three largest are General Motors, Ford, and Chrysler. Most foreign manufacturers, such as Toyota, Datsun and VW, produce only light-duty vehicles and trucks under 6,000 pounds GVWR.

D. Standards and Technology

The light-duty diesel vehicle particulate standards of 0.6 g/mi (0.37 g/km) in 1982 and 0.2 g/mi (0.12 g/km) in 1985 are based on several precepts. To comply with the "greatest degree of emission reduction" mandate of Section 202(a)(3)(A)(iii) and to give "appropriate consideration" to leadtime, cost, noise, energy, and safety factors (required by the same Section) as well, EPA based these standards on the

lowest particulate levels achievable by the worst light-duty diesel with respect to particulate emissions. This basis requires best available control technology, at least for those diesels which have the highest particulate emission levels. The initial standard was based on the lowest particulate level determined to be achievable by the worst case diesel in 1981, as there was too little leadtime to expect any major technological breakthroughs. In fact, due to certification leadtime constraints, EPA has had to delay the implementation date of the initial standard until 1982. The second standard was based on the lowest particulate level determined to be achievable by 1985, as EPA expects significant particulate reductions by then due to the successful application of trap-oxidizers. The 0.2 g/mi (0.12 g/km) level clearly cannot be met by all diesel vehicles at this time, 1981 (or during any earlier model year, if practicable). Such regulations shall contain standards which reflect the greatest degree of emission reduction achievable through the application of technology which the Administrator determines will be available for the model year to which such standards apply, giving appropriate consideration to the cost of applying such technology within the period of time available to manufacturers and to noise, energy, and safety factors associated with the application of such technology. Such standards shall be promulgated and shall take effect as expeditiously as practicable taking into account the period necessary for compliance."

There has been considerable confusion over the role of the carcinogenicity question in this rulemaking. Many diesel health effects programs have been undertaken, with special emphasis on the questions of mutagenicity and carcinogenicity, but these programs will not produce final results for some time. This Rulemaking is in direct response to Section 202(a)(3)(A)(iii) and as such is concerned with total particulate and not with any particular component of the particulate.

Clearly, it is only through the application of best available control technology that "the greatest degree of emission reduction" can be achieved. EPA examined a number of

approaches that could have been used in setting the particulate standards. The approaches considered included setting a standard requiring the best available control technology, and:

1) Based on the lowest particulate level achievable by the best light-duty diesel with respect to particulate emissions;

2) Based on the lowest particulate level achievable by the best light-duty vehicle (gasoline or diesel) with respect to particulate emissions;

3) Based on the lowest particulate level achievable by the worst light-duty diesel with respect to particulate emissions;

4) Requiring an equal level of effort by all manufacturers on each of their vehicle lines.

We rejected the first approach because it would have prevented all diesels from being marketed except for subcompacts and possibly small pick-ups with small engines. The "appropriate consideration" to leadtime, cost, noise, energy, and safety factors required by Section 202(a)(3)(A)(iii) has convinced EPA that Congress did not intend, as a result of this Section, to force any diesel powered vehicles out of production. We did not select the second approach for the same reason; in fact, since gasoline-powered vehicles with three-way catalysts emit very low levels of particulate, a standard based on this approach would likely prevent any light-duty diesel vehicles from being sold in this country. The fourth approach would be workable only if an engine or vehicle parameter could be determined to affect particulate emissions to such an extent that a graduated standard could be based on that parameter. No such parameter has been identified. In addition, adoption of the fourth approach would result in different standards for vehicles competing in the same market. This would conflict with the standard policy of equal treatment towards all light-duty vehicles which have the general purpose of personal transportation. Thus, we based the particulate standards on the lowest particulate levels achievable by the worst light-duty diesel with respect to particulate emis-

sions. This approach allows standards which provide significant particulate reductions, but which do not force any diesel models out of production, unless the manufacturer refuses to make the necessary changes to meet the standards. This approach requires at least some manufacturers to utilize the best available control technology.

When projecting a near-term standard when little time exists for technological advances, it is relatively simple for a regulatory agency to predict what the best available control technology will be, and to set a standard based on its application. It is more difficult to regulate on this basis in the long-term because of the uncertainty that inevitably surrounds expected technological improvements. Nevertheless, to fulfill the "greatest degree of emission reduction" mandate of the Clean Air Act, EPA has concluded that it is absolutely necessary to issue standards which motivate the private sector to maximize its efforts in reducing particulate emissions from light-duty diesel vehicles. Experience has shown that in absence of the regulatory incentive, the automotive industry has often ignored environmental concerns. This is not surprising, as emission control is a classical economic externality to the automotive manufacturer, and as such would receive little or no attention due to pressure from the marketplace. The attempt to require best available control technology in the future often requires technology-forcing standards, standards which are admittedly unattainable at the time they are proposed, but which the regulatory agency expects to be attainable by the time they take effect. While recognizing the inherent uncertainty of technology-forcing standards, EPA reaffirms its support of them in general, and of their application in this particular rulemaking. Both the 1982 and 1985 particulate standards have been based upon the levels achievable by the highest particulate-emitting light-duty diesel vehicle utilizing best available control technology.

2. Particulate/ NO_x Relationship

One factor that had complicated the diesel particulate regulations was the uncertainty surrounding the diesel NO_x

standard for the years 1981 to 1984. The Clean Air Act mandated a light-duty vehicle NO_x standard of 1.0 g/mi (0.62 g/km) beginning with the 1981 model year,[5] but it included a provision allowing EPA to

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ENVIRONMENTAL PROTECTION AGENCY

[FRL 1381-4]

NO_x Waiver Decision; Decision Of The Administrator

I. Introduction

Section 202(b)(1)(B) of the Clean Air Act, as amended ("Act"), establishes the standards applicable to emissions of oxides of nitrogen (NO_x) from light-duty vehicles and engines manufactured during and after model year 1977.[1] This section

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[1] 42 U.S.C. 7521(b)(1)(B)(Supp. I 1977). Congress first set statutory emissions standards for NO_x emissions from light duty vehicles and engines in the 1970 Amendments to the Act. Clean Air Act Amendments of 1970, Pub. L. No. 91-604, 81 Stat. 499 (1970). Section 202(b)(1)(B) of that version of the Act required that NO_x emissions standards for 1976 and later model year vehicles represent a 90 percent reduction from the average emissions of NO_x actually measured from light-duty vehicles manufactured during model year 1971 which were not subject to any Federal or State NO_x emission requirements. Section 202(b)(5)(B) permitted the Administrator to grant a one year suspension of this standard if the manufacturers could meet the statutory criteria. *See,* Clean Air Act, as amended 1970. §202(b)(5)(B). These criteria also applied to suspension of carbon monoxide and hydrocarbon emissions standards.

In 1974 Congress amended the Act and established a 2.0 gpm NO_x standard for light-duty vehicles and engines manufactured during model year 1977, and postponed the effective date of the "90 percent reduction standard" until model year 1978. Energy Supply and Environmental Coordination Act of 1974, Pub. L. No. 93-319 (1974). Although suspension provisions were retained from the 1970 version of the Act for statutory carbon monoxide and hydrocarbon emissions standards, the NO_x suspension provision was not retained by Congress. Compare the Clean Air Act, as amended, 1970, §202(b)(5), with the Clean Air Act, as amended, June, 1974, §202(b)(5).

In 1977, Congress again amended the Act, extending the 2.0 gpm NO_x standard for light-duty vehicles and engines through

requires the Administrator of the Environmental Protection Agency (EPA) to promulgate regulations containing standards which provide that NO_x emissions may not exceed 2.0 grams per vehicle mile (gpm) for model years 1977 through 1980, and may not exceed 1.0 gpm for 1981 and later model years.

Section 202(b)(6)(B) of the Act authorizes the Administrator to delay implementation of the 1.0 gpm NO_x standard by waiving it under certain conditions to permit the use of diesel engine technology.[2] Section 202(b)(6)(B) of the Act provides that, upon the petition of a manufacturer, the Administrator may waive the 1.0 gpm NO_x standard to a level not to exceed 1.5 gpm, for any class or category of diesel-powered light-duty vehicles and engines manufactured during the four model year period beginning with model year 1981. In order to obtain a waiver, the manufacturer must show that it is necessary to permit the use of diesel engine technology in the class or category of vehicles or engines for which a waiver is requested. Moreover, the Administrator must determine:

(i) That such waiver will not endanger public health,

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model year 1980. For model years 1981 and after, the 90 percent reduction standard of 0.4 gpm was established as a research objective, and a standard of 1.0 gpm was established, based upon the manufacturers' testimony on their ability to develop the requisite technology to meet 1.0 gpm.

[2] 42 U.S.C. 7521(b)(6)(B)(Supp. I 1977). Although the House and Senate versions of the waiver provision referred generally to "innovative technology", it is evident from the early legislative debates that the waiver was intended to further the development of diesel technology in particular because of its potential for fuel economy benefits and improved emissions. *See, e.g.*, 123 Cong. Rec. 4945 (daily ed. May 24, 1977) (remarks of Congressman Rogers); 123 Cong. Rec. 5106-7, 5117, 5119-20 (daily ed. May 26, 1977) (remarks of Congressman Dingell, Preyer and Broyhill); 123 Cong. Rec. 9294 (daily ed. June 9, 1977) (remarks of Senator Baker). The Conference Committee separated the current waiver provision dealing solely with diesels from the general provision for innovative technology, now section 202(b)(6)(A) of the Act, 42 U.S.C. 7521(b)(6)(A)(Supp. I 1977).

(ii) That such waiver will result in significant fuel savings at least equal to the fuel economy standard applicable in each year under the Energy Policy and Conservation Act ("EPCA"), and

(iii) That the technology has a potential for long-term air quality benefit and has the potential to meet or exceed the average fuel economy standard applicable under EPCA at the expiration of the waiver. The major consideration in providing for waiver of the NO_x standard for diesel-powered vehicles was the potential fuel economy benefits of diesel technology.[3] Because control of NO_x emissions from diesel engines appeared to be a more difficult technical problem than NO_x control in gasoline-powered vehicles, Congress did not want to preclude use of this fuel-efficient technology in light-duty vehicles due to the stringent 1.0 gpm NO_x standard. However, it is clear that Congress did not intend that consideration of fuel savings override consideration of public health and air

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[3] The waiver for innovative technology contained in the Dingell-Broyhill amendment adopted by the House, which provided the basis for the statutory waiver, specified that there should be the potential for "substantial energy savings *** as compared to conventional power trains incorporating spark ignited, gasoline, internal combustion engines." H.R. 6161, 95th Cong., 1st Sess. §203 (1977); *see also* 123 Cong. Rec. 4958, 5106 (daily ed. May 24, 1977) (remarks of Congressman Dingell). The Senate version, originating in the amendment introduced by Senator Baker, would have allowed waivers for innovative engines systems with "fuel economy at least equivalent to the fuel economy standard applicable in such model year under the Energy Policy and Conservation Act". 123 Cong. Rec. 9299 (daily ed. June 9, 1977); H.R. 6161 (Senate version), 95th Cong. 1st Sess. §203 at p. 326 (1977). This language was substantially incorporated in the final waiver provision as the second waiver criterion under §202(b)(6)(B), which requires a finding of "significant fuel savings at least equal to the fuel economy standard applicable in each year under the Energy Policy and Conservation Act *** "*See also* 123 Cong. Rec. 9294 (daily ed. June 9, 1979) (remarks of Senator Baker).

quality.[4] While the NO_x waiver provision is intended to further the development of diesel technology, it is not intended as an unqualified endorsement of that technology. Therefore, the NO_x waiver provision, according to Senator Muskie, "is not intended to provide a loophole in the statutory standards, but only to provide an opportunity for technology development which may lead to greatly improved emissions performance in the next decade."[5]

On July 14, 1978, guidelines for the submission of applications under this waiver provision were published in the Federal Register.[6] The guidelines follow the language of the Act in placing an affirmative burden on the manufacturer to supply information sufficient to satisfy independently each of the waiver criteria set forth above for each engine family for which a waiver was requested,[7] and in stressing that

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[4] H.R. Rep. No. 294, 95th Cong., 1st Sess. 250-51 (1977); 123 Cong. Rec. 5120 (daily ed. May 20, 1977) (remarks of Congressman Broyhill); 123 Cong. Rec. 13703 (daily ed. Aug. 4, 1977) (remarks of Senator Muskie).

[5] 123 Cong. Rec. 13703 (daily ed. August 4, 1977).

[6] 43 FR 30341 (July 14, 1978).

[7] GM has argued that the diesel engine waiver was intended to apply to all light-duty diesel vehicles. General Motors Application, Supplement, dated July 18, 1979 ("GM Supp.") 1-4.

I have the statutory authority to grant a waiver for individual engine familes. Section 202(b)(6)(B) of the Act expressly provides; the Administrator *** may waive the (NOx) standard *** *for any class or category of light-duty vehicles and engines* manufactured *** if the manufacturer can show that such waiver is necessary to permit the use of diesel engine technology *in such class or category of vehicles or engines.* (Emphasis added.)

In order to interpret section 202(b)(6)(B) as limiting my authority to granting a waiver to all or no diesel engine families, the language emphasized above would have to be read completely out of the statute. I refuse to so read the statute. The language of section 202(b)(6)(B) indicates that Congress clearly contemplated waivers for classes or categories of diesels, not all diesels, and I

Since the manufacturers themselves have argued their need for a NO_x waiver so that they can meet EPA's proposed diesel particulate emission standards and to give them an opportunity to introduce their more effective control technologies into the 1982 California market, this decision should enable them to fully comply with the final diesel particulate standard promulgated by EPA while meeting California's 1982 emission standards.

In addition, the manufacturer should continue to study the components and health effects of diesel emissions and should work with EPA to assess and alleviate potential health problems. EPA's research program to assess the public health significance of diesel emissions[173] will continue to generate health effects data, which may indicate a need for EPA to take regulatory action in this area. As indicated above, this proceeding does not allow me to control production of light-duty diesels or emissions levels of pollutants other NO_x.[174]

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have interpreted "class or category" to be synonymous with "engine family". 43 FR 30341, 30342 (July 6, 1978). The term "engine family" is defined in 40 CFR 86.077-2 (1977) as "the basic classification unit of a manufacturer's product line used for the purpose of test fleet selection as determined in accordance with" 40 CFR 86.077-24. The latter section lists the characteristics and specifications for which a group of engines must be identical in order to be considered an "engine family" and therefore a "class or category."

The legislative history supports this interpretation. In presenting the Conference Report to the Senate, Senator Muskie stated in regard to the diesel NO_x waiver provision:

This waiver is to be applied on a class or category basis, rather than across the board. It is only available for a *particular* class or category of light

[173] Barth, D. and Blacker, S., "The EPA Program To Assess The Public Health Significance of Diesel Emissions", 28 *Journal of the Air Pollution Control Association* 769, August 1978.

[174] I have been urged to deny all waiver requests on the ground that I cannot make an affirmative determination that the diesel

However, I must caution the manufacturers to proceed with the full realization that EPA has the authority to act in the future under other provisions of the Act to prevent diesel emissions from posing an unacceptable risk to public health.[175]

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technology would not endanger public health, in view of the evidence suggesting a cancer risk. EDF Comments 9-10; Comments of the Natural Resources Defense Council, July 13, 1979; Comments of the American Lung Association, June 1979. However, I do not believe that this proceeding is the proper forum for assessing the relative risks associated with gasoline vehicle emissions and diesel emissions for the following reasons. First, the "waiver," although presumably necessary to permit use of diesel technology in the particular vehicle class, is not a necessary condition to increased production of light-duty diesels, and waiver denial is not sufficient to ensure that gasoline vehicles would be substituted. Second, Congress made specific provision in section 202(a)(4) of the Act for the balancing of health risks from emissions of unregulated pollutants associated with competing technologies. (42 U.S.C. 7521(a)(4) (Supp. I 1977).) Applicants for vehicle certification must explore reasonably foreseeable problems or potential problems associated with unregulated pollutants emitted from the vehicle technology, and make an adequate showing that the system would not cause or contribute to an unreasonable risk to public health, welfare and safety. My assessment of the vehicle technologies for which certification is requested necessarily involves a comparison between the unregulated pollutant risks of the standard internal combustion gasoline-powered engine and those of the competing technologies (See H.R., No. 294 95th Cong., 1st Sess. 278-79 (May 12, 1977)). This section authorizes me to deny applications for certificates of conformity if the vehicle manufacturer fails to meet the burden of proof; therefore, controlling production of a suspect vehicle technology is dealt with more appropriately under section 202(a)(4). When the manufacturers apply for certification for the 1981 model year, I will be in a position to and will deermine, as in previous model years since 1979, whether the vehicles presented for certification (diesels and other systems) will pose an unreasonable risk to public health, welfare and safety.

[175] 42 U.S.C. 7521(a)(4), 7525(a)(3) (Supp. I 1977); H.R. Rep. No. 294, 95th Cong., 1st Sess. 29, 237, 250-51 (1977).

C. Fuel Economy

The fuel economy benefit of diesel vehicles was a major consideration in the enactment of the diesel NO_x waiver provision.[176] The manufacturers have stressed the fuel economy benefits in their applications[177] and at the public hearings.[178] The manufacturers estimate this beneift to be an improvement over gasoline-powered vehicles of between 25 and 50 per cent.[179]

Fuel economy considerations are contained in the second and third criteria of section 202(b)(6)(B).[180] The second criterion provides that a waiver may be granted if I determine that it will result in significant fuel savings at least equal to the fuel economy standard applicable in each year under the Energy Policy and Conservation Act [EPCA].[181] To meet this criterion, the applicant must show that the "base level" for the class or category for which a waiver is requested will meet

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[176] Guidelines, 43 FR 30342 (July 14, 1978); *See, supra,* note 3.

[177] GM App. I-7; D-B App. I-16 and IV-1; P App. 1-4; VW App. 1-12; V App. 1-3 to 14.

[178] *See, e.g.*. June 19 Tr. 138.

[179] June 19 Tr., 138 (GM) (25 percent); P App. 1-4 (30 percent for city driving); VW App. §1-12 (50 percent). EPA is currently re-evaluating the "fuel equivalency factor" (under 40 CFR 500.510-80(b)(2)(iii)) between diesel fuel and gasoline of 1:1 in order to determine whether these estimates are accurate. Under the present ratio, the miles per gallon (mpg) of one gallon of gasoline may be directly compared to mpg of one gallon of diesel fuel for equivalent vehicles without any corrective factor.

[180] Clean Air Act, as amended. §202(b)())(B)(ii) and (iii), 42 U.S.C. 7521(b)(6)(B)(ii) and (iii) (Supp. I 1977).

[181] Sections 502(a)(i) of EPCA establishes fuel economy standards for 1978-80 and 1985 and there after and provides the Secretary of Transportation with the authority to promulgate standards for 1981-84. 15 U.S.C. 2002(a)(1)(1975).

the applicable EPCA fuel economy standard.[182] The fuel economy standard for the 1981 model year is 22 miles per gallon (mpg) and the standard for the 1982 model year is 24 mpg.[183] All of the base levels of the engine families listed in the summary will meet or exceed the fuel economy standards for 1981 and 1982.[184]

The third criterion provides that a waiver may be granted if I determine that the diesel engine technology has the potential to meet or exceed the average fuel economy standard applicable under EPCA at the expiration of the waiver. To meet this criterion, the applicant must show that there is a substantial likelihood that the average fuel economy of the applicant's diesel fleet will meet or exceed the EPCA standard.[185] The EPCA standard for 1983, the expiration year of the waivers, is 26 mpg.[186] I find that there is a substantial likelihood that the average fuel economy of the diesel fleets of the applicants listed in the summary (GM, D — B and Volvo) will meet or exceed 26 mpg.[187]

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[182] Guidelines, 43 FR 30343 (July 14, 1978). Base level means "a unique combination of basic engine, inertia weight, and transmission class." 40 CFR 600.002-77(23)(1977).

[183] 49 CFR 531.5 (1978).

[184] Appendix A. §VII; V App. 4-1; VW App. 4-3; D-B App. I-15 to I-16, IV-1, Exhibit C.

[185] Average fuel economy means "the production-weighted combined fuel economy value of all passenger automobiles produced by a manufacturer in a single model year as computed in 40 CFR 600.510" 40 CFR 100.002-77(14) (1977).

[186] 49 CFR 531.5 (1978).

[187] Appendix A, §VII; *See also*, VW App., 1-12, 4-1 to 4-2; D-B App., I-15 to I-16, IV-1, Exhibit C. The reference to "technology" and the inclusion of the word "average" in the third criterion clearly evinces an intent on the part of Congress that I look at the entire diesel technology of an applicant at the expiration of a waiver period.

D. Long Term Air Quality Benefit

In order for a waiver to be granted the applicant must show that diesel engine technology has the potential for long-term air quality benefit.[188] This criterion is met if there is a substantial likelihood that the engines will be able to comply with the statutory emissions standards applicable at the expiration of the waiver period.[189] The statutory standards applicable at the expiration of the waiver period, model year 1983, are, in addition to the 1.0 gpm NO_x standard, standards of 3.4 gpm for emissions of carbon monoxide (CO) and 0.41 gpm for emissions of hydrocarbons (HC).[190]

I have found that a small-scale phase-in of the technology necessary to meet a 1.0 gpm NO_x standard in California in model year 1982 to be necessary to avoid risks in nationwide production of the 49-state fleet. As discussed previously, the California phase-in will provide an adequate proving ground for diesel emission control technologies[191] necessary to meet a 1.0 gpm NO_x standard.[192] Therefore, there is a

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[188] 42 U.S.C. 7521(b)(6)(B)(iii) (Supp. I 1977).

[189] *See* 123 Cong. Rec. 13703 (Aug. 4, 1977) (remarks of Senator Muskie); *see also* 43 Fed. Reg. 30343, 30347 (July 14, 1978).

[190] 42 U.S.C. 7521(b)(1)(A), (B) (Supp. I 1977).

[191] See discussion of applicants' proposed emission control systems in section III. A.1. of text.

[192] The manufacturers must meet, as a minimum, standards of 1.0 gpm NO_x, 41 gpm HC and 7.0 gpm CO for light-duty vehicles in the 1982 model year in California. Since diesel engine technology exhibits lower CO emission levels than gasoline vehicles, the manufacturers should not have any problem meeting the federal CO standard of 3.4 gpm in 1983.

IN THE

United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 80-1464

GENERAL MOTORS CORPORATION, Petitioner,
MERCEDES-BENZ OF NORTH AMERICA, INC.,
et al., Intervenors,
v.
DOUGLAS M. COSTLE, Administrator,
Environmental Protection Agency, Respondent.

No. 80-1312

NATURAL RESOURCES DEFENSE COUNCIL, INC.,
Petitioner,
v.
DOUGLAS M. COSTLE, Administrator,
Environmental Protection Agency, Respondent,
GENERAL MOTORS CORPORATION, *et al.*, Intervenors.

No. 80-1710

MERCEDES-BENZ OF NORTH AMERICA, INC., Petitioner,
v.
DOUGLAS M. COSTLE, Administrator,
Environmental Protection Agency, Respondent.

No. 80-1712

NATURAL RESOURCES DEFENSE COUNCIL, INC.,
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DOUGLAS M. COSTLE, Administrator,
Environmental Protection Agency, Respondent.

On Petition for Review of Final Action of the Administrator, Environmental Protection Agency

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BRIEF OF PETITIONER GENERAL MOTORS CORPORATION

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to grant the suspension. The Administrator supported this prediction with a methodology [18] that incorporated numerous assumptions. He employed this methodology to overcome actual data, submitted by the manufacturers, that established that of several hundred test vehicles, "only one car conformed to the [standards]. No car had actually been driven 50,000 miles, the statutory 'useful life' of a vehicle and the time period for which conformity to the emission standards is required." 155 U.S. App. D.C. at 438, 478 F.2d at 625.

In *International Harvester*, this Court expressly recognized that "[t]he Administrator's latitude for projection is subject to the restraints of reasonableness and does not open the door to 'crystal ball' inquiry." 155 U.S. App. D.C. at 425, 478 F.2d at 629. Moreover, it is beyond serious dispute that "[t]he Administrator's latitude for projection is unquestionably limited by relevant considerations of lead time needed for production. Implicit also is a requirement of reason in the reliability of the EPA projection." *Id.* In essence, it is necessary to "distinguish between prediction and prophecy." 155 U.S. App. D.C. at 438, 478 F.2d at 642.

After articulating these principles, the *International Harvester* Court "address[ed] itself attentively to the problems which seemed to inhere in EPA's methodology in assessing the reliability of the agency's predictions." Leventhal, *Environmental Decisionmaking and the Role of the Courts*, 122 U. Penn. L. Rev. 509, 533 (1974).[19] This Court ultimately

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[18] The "methodology" reviewed in *International Harvester* consisted of calculations based on known data. In the case at bar, research has not progressed sufficiently to permit any such calculations. There are no data that would provide the basis for such an exercise.

[19] Congress subsequently expressed approval of the *International Harvester* analysis: "While projections . . . are authorized, they are 'subject to the restraints of reasonableness and cannot be based on crystal ball inquiry.' " H.R. Rep. No. 294, 95th Cong., 1st Sess. 49, 273 (1977), *reprinted in* [1977] U.S. Code Cong. & Ad. News 1077, 1127, 1352. Moreover, Congress intended that the courts continue their "thorough, comprehensive review" of agency projections. H.R. Rep. No. 564, 95th Cong., 1st Sess. 178 (1977), *reprinted in* [1977] U.S. Code Cong. & Ad. News 1502, 1558.

C. There Is Insufficient Lead Time to Develop a Diesel Particulate Trap System for Installation in Production Vehicles by Model Year 1985

As explained in the analysis of pertinent statutory provisions and legislative history (Argument I, *supra*), *any* regulation prescribed under Section 202(a)(1) of the Act, including particulate regulations, must be based upon a finding of technological feasibility incorporating the fundamental concept of lead time. *See* Section 202(a)(2). *See generally,* Currie, *The Mobile Source Provisions of the Clean Air Act*, 46 U. Chi. L. Rev. 811, 824 (1979). Moreover, as *International Harvester* makes clear, the Administrator is required to "consider the lead time needed for production" when he promulgates standards based on projections of future technological achievability. 155 U.S. App. D.C. at 438, 478 F.2d at 629. EPA's conclusion that sufficient lead time exists to complete research and development of the technology required to achieve compliance with the 1985 particulate standards is overly optimistic and clearly unreasonable.

Lead time to comply with the regulations challenged here must include both the successful completion of basic research, which permits development of trap system designs to proceed, and the time necessary to integrate the final design, once developed, into mass production. There are several intermediate steps between completion of current research and production of 1985 vehicles. In general, these include: 1) technological research and development; 2) successful incorporation of the technology in a vehicle application; 3) certification of conformity with all emission standards over the course of at least 50,000 miles; 4) preparation for mass-production (*e.g.*, tooling); and, 5) production. With regard to vehicles required to meet the 1985 particulate standard, several of these steps will consume an indeterminate amount of time and the time consumed in completing one step necessarily compresses the time remaining for completion of the others. Tooling commit-

ments must be made well in advance of production. Similarly, the certification process, which can consume as much as 18 months from vehicle build through successful completion of testing, should be completed before production begins. In accordance with these considerations, lead time must be analyzed in light of its constituent elements.

Despite its acceptance of a "2½-3 years figure as GM's best estimate of the leadtime necessary for trap oxidizers, *once a design is selected*," (Regulatory Analysis at 52; JA 531) (emphasis supplied)), EPA estimated that research and development could be completed within the next "1½ to 2 years" (*id.*) and that production lead time of "2 to 2½ years" (*id.*) would suffice to assure the successful application of a final developed design in a production vehicle. However, no final design can be selected until further extensive *basic research* and accumulation of data are performed in the following areas: material efficiency and durability, trap configuration and location, representative driving cycles, method of regeneration and method of regeneration initiation and control. Thus, not a single grain of sand can begin to pass through the hour-glass which measures the lead time necessary for development and production of trap systems until an acceptable design approach (let alone a final design) exists.

Nevertheless, applying its own estimates, EPA concludes that trap-oxidizers will be feasible for vehicle application in 1984 but immediately retreats from that position because of "the uncertainty that exists with regard to trap-oxidizer durability and vehicle application," thus establishing a 1985 effective date to "ensure" sufficient lead time. Regulatory Analysis at 52; JA 531. Examined in light of the evidence contained in the record, even this "fall-back" position is demonstrably untenable.

It is beyond serious dispute that further research regarding aftertreatment technology is required. Experimental investigations to date have been devoted to defining only the

broad parameters of the necessary technology. The development phase, during which these basic parameters are optimized for production application, is barely in its infancy. Given the magnitude and complexity of the task which remains, it is unreasonable for the Administrator to conclude that effective trap technology will be developed within the next two years. The Administrator has not demonstrated that his optimistic conclusion is "founded upon scientific information which he could reasonably conclude that the . . . problem[s] will be cured soon enough . . ." *Duquesne Light Co., supra*, 522 F.2d at 1199.

Production lead time is reduced by each passing day until a final resolution of every significant issue confronted in research and development is identified. Then, and only then, can manufacturers begin the process of making provision for incorporation of the developed technology in the vehicle as a part of the mass-production process. This effort must also include design, procurement and installation of the tools necessary to produce the trap device, whether these tasks are accomplished internally or by arrangement with an outside firm under contract to provide tools or completed trap systems meeting the manufacturer's specifications.

Failing to appreciate the significance of all of these interdependent factors affecting the amount of lead time remaining until 1985, EPA relies entirely upon its presumed power to promulgate any "technology-forcing" standard it pleases as a subterfuge for the finding of technological feasibility required by statute. In essence, EPA exhorts manufacturers to hurl an unquantified amount of financial and human resources at the problems in a vain attempt to transform EPA speculation into accomplished fact. By requiring that EPA make a determination that technology will be available to permit compliance with these regulations, Congress demonstrated its awareness that the resources of manufacturers are not infinite and that no mortal being is

capable of altering the immutable laws of physics and thermodynamics regardless of the motivation for the desired change. Neither the Agency nor the Congress can direct that a given invention occur by a given date. Nor can the development of technology be rigidly scheduled. In testimony at the public hearing on the particulate rules, GM Vice President Dr. Betsy Ancker-Johnson explained that "[w]hen you have to invent something or someone else has to invent an entirely new thing to accomplish a goal, you can't put a time scale on that . . . you may never get an answer." Statement of General Motors Corporation, March 19, 1979 at 192; JA 170.[26] If Thomas Edison had been ordered by the government to invent the light bulb by a given date, we might still be in the dark!

Vindication of EPA's evasive approach with respect to the required technology determination on the facts presented here would eviscerate the Congressional mandate that is designed to provide some degree of protection from arbitrary and capricious agency action. Because the Administrator has adduced no evidence "to specify at what pace the technology will develop," *id.*, his prediction that there will be sufficient lead time is inadequate to satisfy either Section 202(a)(2) of the Act or the requirement, articulated

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[26] Further, as noted by the distinguished industrial economist, Professor Edwin Mansfield in testimony before the Subcommittee on Science, Research and Development of the Committee on Science and Astronautics of the House of Representatives:

> "If the experience of the last 20 years in defense R. & D. and elsewhere has taught us anything, it has taught us how difficult it is to plan technological development. Technological change, particularly of a major or radical sort, is marked by great uncertainty." Hearings Before Subcommittee on Science, Research and Development of the House Committee on Science and Astronautics, 92d Cong. 2d Sess. 102 (1972).

Numerous extensive programs relating to diesel particulate emissions have been in place for a number of years (since 1974) and continue today. Representing the commitments made by manufacturers to the resolution of issues raised in the course of those programs, GM has contacted and worked to varying degrees with well over 50 outside firms. GM Response at 74-72; JA 226-234.

in *International Harvester* and subsequent decisions, of a reliable and reasoned decision making.[27]

D. There Are No Data Supporting the Reliability of the Administrator's Prediction That the 1985 Light-Duty Truck Standards Are Technologically Achievable

The record inadequately supports the reliability of the Administrator's prediction that technology will be available in model year 1985 to permit compliance with the 1985 light-duty vehicle standards. This conclusion applies with even greater force to the 0.26 gpm light-duty truck standard because there are *no* data in the record regarding the application of trap technology to such vehicles.

The standard was empirically developed by EPA purportedly to account for the effects of inertia weight and road load on particulate emissions. These factors were

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[27] Lead time analysis must include a recognition that development effort must also focus on a series of other standards becoming effective prior to 1985. In arriving at its conclusion that trap technology will be available in 1985, EPA obliviously implies that resolution of these remaining problems is primarily a function of the resources allocated to the effort, as if achievement of technological progress in the area of diesel particulate emission control were the only activity requiring the commitment of resources. Such a single-purpose orientation obscures the reality of the enormous challenges confronting manufacturers over the next several years.

For example, GM has *five separate development programs* underway in an attempt to assure compliance with various emission requirements becoming effective between now and 1985. Briefly described, these programs include the development of highly sophisticated computerized electronic engine and emission controls designed to meet the following regulatory requirements: 1982 California NOx standard; 1983 Federal NOx standard; and, 1984 emission standards at all altitudes. These requirements must be met in addition to other emission standards, including the 1982 and 1985 particulate standards. Research and development time is severely limited given the differing control strategies that must be implemented, which further compresses the production lead time necessary to incorporate the required technology in production vehicles in order to assure compliance with this procession of requirements.

IN THE

United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 80-1464

GENERAL MOTORS CORPORATION, Petitioner,
MERCEDES-BENZ OF NORTH AMERICA, INC.,
et al., Intervenors,
v.
DOUGLAS M. COSTLE, Administrator,
Environmental Protection Agency, Respondent.

No. 80-1312

NATURAL RESOURCES DEFENSE COUNCIL, INC.,
Petitioner,
v.
DOUGLAS M. COSTLE, Administrator,
Environmental Protection Agency, Respondent,
GENERAL MOTORS CORPORATION, *et al.*, Intervenors.

No. 80-1710

MERCEDES-BENZ OF NORTH AMERICA, INC., Petitioner,
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On Petition for Review of Final Action of the Administrator, Environmental Protection Agency

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REPLY BRIEF OF PETITIONER GENERAL MOTORS CORPORATION

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Further, EPA's inaccurate portrayal of the GM position notwithstanding (EPA Br. at 63), GM did *not* insist that 50,000-mile durability be "presently demonstrated" as a condition of the validity of the 1985 particulate standards. Rather, focusing on the fact that only one trap has demonstrated acceptable durability for roughly 25 percent of the mileage that will be required of production systems and the "real-world" considerations of *actual driving conditions* (GM Br. at 29-30), GM contended that EPA had not adduced any reasonable support for its *prediction* regarding the achievability of the 1985 standards. GM Brief at 31.[16] This contention, and the evidence upon which it is predicated, remains unanswered.

2. *Trap Regeneration*

Studiously avoiding any acknowledgement of GM's primary contention that its laboratory-type testing of the concept of air intake throttling "would be difficult to duplicate consistently in a real-world vehicle application" (GM Br. at 33) or of its own report indicating that "throttling . . . may be disastrous [sic] in the field" (*id.* n. 23), EPA blithely maintains that the GM testing supports the Agency's prediction of achievability. In EPA's testing, traps are regenerated by operating vehicles at 60 mph, in excess of the national speed limit. *See* Diesel Particulate Trap Study: Interim Report on Status of Study and Effects of Throttling (May 18, 1979) JA 729. Thus, the high or even moderately high speeds (over 35 mph) required for regeneration pose practical problems. GM Resp. at 112, Fig. V-24, JA 264. As suggested by GM's discussion of "real-world" implications (GM Br. at 29-30), some customers might *never* attain these speeds. EPA simply ignores the potential hazards of long-term accumulation of particulates in vehicles that might be used for months only for short trips at speeds never in excess of 25 mph.

[16] The imagined inconsistency referred to by EPA in the context of its discussion of trap configuration and location (EPA Br. at 63 n. 55) underscores the fact that EPA confuses mere "possibilities" with absolute "certainties."

With regard to the auxiliary heat supply technique of regeneration (GM Br. at 33-34), EPA ignores the potential for power shortages in the vehicle electrical system when the heating element is activated, and focuses entirely on the method of initiating and controlling regeneration. Seeking to reduce GM's contention here to nothing more than a semantic quarrell with the language of the Regulatory Analysis,[17] EPA emphasizes that manufacturers have developed electronic control for *other* emissions and that GM has defined the parameters necessary for the computer to control (EPA Br. at 62). Information in the record clearly contradicts EPA's suggestion that all of the relevant control parameters have been defined. GM Resp. at 116, 119. In fact, the relevant parameters cannot be delineated unless and until *a final design is selected.* The Agency continues to be silent, however, with respect to the issues of whether these facts support its prediction of achievability under actual driving conditions in 1985 vehicles.

3. *Trapping Efficiency*

Ignoring the fact that trapping efficiency is an extremely narrow concept that is virtually meaningless in the absence of acceptable durability and regenerative capability (GM Br. at 35), EPA again rests its prediction of achievability on the slender thread of one low emitting Opel vehicle that accumulated only 12,800 miles on a very light driving schedule with speeds not in excess of 45 mph.

4. *Lead Time for New Technology*

EPA's simplistic view of lead time also ignores the clear import of GM's arguments. In essence, EPA seeks to con-

[17] EPA makes a remarkably candid admission that the language of the Regulatory Analysis regarding this issue is "perhaps imprecise." EPA Br. at 62. It is this very imprecision that pervades the entire Regulatory Analysis upon which the standards were based. The Agency's superficial guesswork lies at the heart of the Administrator's inability to articulate a reasoned basis for his projections.

vey the impression that the entire issue of lead time may be distilled into the inaccurate assertion that manufacturers have 4½ years to solve a simple "materials [selection] and engineering problem." EPA Br. at 65. For several reasons, this oversimplified concept of lead time cannot withstand analysis.

According to EPA, manufacturers have been provided with abundant time to permit the "finishing touches" on a "simple technology." EPA Br. at 34. The short answer to EPA's argument is that, although much has been learned, GM is no closer to selecting an optimum trap material, design, location, or regeneration approach than it was at the time of the rulemaking proceeding. Thus, lead time already has been eroded substantially and, of course, production lead time cannot even begin to run until after this task is completed. Regarding this point, EPA omits any reference to GM's estimate that it would need 50 months to bring a system to production once the system has been identified. GM Resp. at 175, JA 284. The "basic concept" of the required technology might be "well understood" (EPA Br. at 65), but its *implementation* clearly is not. Moreover, with regard to "materials selection," GM has tested hundreds of materials and found none to be adequate. Thus, to date no viable choices exist in this area.

The lead time discussion provided in the opening GM brief clearly illustrates that the 4½ year figure used by EPA, when separated from the context of the various steps that must be completed successfully by 1985, is illusory. Trap technology remains in the initial stage of the lead time process that consists of research and development. EPA's assertion that simple engineering solutions to problems that have been identified thus far flatly contradicts its earlier recognition that more fundamental theoretical *basic research* remains to be done in each of the critical areas of

durability and regeneration.[18] GM Br. at 28. Basic research must then be followed with applied research leading to the successful practical incorporation of the technology in a vehicle application that will perform effectively under "real-world" conditions. Only then can manufacturers begin the process of certifying conformity with emission standards over the course of at least 50,000 miles. The certification process alone can consume as much as 18 months. In addition, commitments to buy or manufacture the required tools and efforts to integrate these tools into the mass production process must be made well in advance of production, which must begin at least five months before the beginning of calendar year 1985.

"Tools" of course refers to machinery, dies and other equipment used to fashion raw or partially finished materials into a finished component part. Tools must be carefully built within exceedingly narrow ranges of tolerance according to exacting specification in order to assure a reliable product. Tools cannot be designed or ordered until a final design is selected. *See* GM Br. at 44. Given GM's estimate of production lead time after selection of a finel design, tooling commitments should be made within the next few months. Thus the 4½ years of remaining lead time claimed to exist by EPA can only be the product of wishful thinking. Further, GM is nowhere near the point of selecting a final design. *See* text, *supra,* at 18.

Further, the alleged harm argued by EPA (EPA Br. at 65, n. 60) and NRDC (NRDC Br. at intervenor at 39) has

[18] EPA's failure to grasp the significance of this point contributed to the confusion evident in its claim that GM contradicted itself in maintaining that development remained in its infancy when its own trap research began in 1974. EPA Br. at 64 n. 58. The full context of GM's discussion of the development phase indicates that *optimization* of the broad parameters identified in the research phase *for production application* remains in its infancy. GM Br. at 45. Moreover, it is a testament to the infancy of the development phase that, after 6 years of investigation, basic research remains incomplete and the best evidence of achievability to date consists of one trap that survived 12,800 miles on a light driving schedule.

nothing to do with GM's arguments. GM at no time has contended that EPA is not permitted to promulgate standards where projections of future technologies are necessary or that technological progress should be "frozen." Rather GM has consistently maintained, in accordance with the applicable legal authorities cited in its opening brief and further discussed in subsection A of this Argument, *supra*, that EPA's projections must be *reasonable* and *explained*. Conclusory assertions that its projections are "justified by the record, and should be upheld" (EPA Br. at 64), absent any data or other support beyond the incantation of general principles of deference, latitude and "technology-forcing" capabilities, cannot be permitted to excuse EPA's adherence to the obligations imposed by these requirements.[19]

C. The Administrator Has Not Demonstrated That His "Consideration" of Safety Faicors Was "Appropriate"

EPA misconceives the thrust of GM's arguments regarding safety considerations. Rather than claiming that technology must exhibit "zero risk" or be *rejected* (EPA Br. at 68), GM maintained that the Agency should have provided at least some analysis of the technological progress required to address the safety concerns idientified thus far (GM Br. at 51).[20] Maintaining its silence regarding the basis for its superficial expectation that trap-oxidizers "would have the same type of safety characteristics as oxi-

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[19] Regarding the light-duty truck standard, the foregoing objections as well as EPA's continued failure to articulate a reasoned basis for its conclusion that a 0.26 standard sufficiently accounts for the variety of different *use* of trucks, renders argument beyond the contentions advanced at 49-50 of the GM Brief unnecessary.

[20] EPA's attempt to portray safety concerns as "marginal" conflicts with evidence that trap-oxidizers operate at extremely high temperatures (GM Br. at 32) and that they are subject to catastrophic failure by fire. Indeed, specific instances of this type exist in the record. GM Br., Addendum B. *See* Transcript of Proceeding (Volume 2) 68 (March 20, 1979) JA 171. *See also* GM Response at 115, Fig. V-26, JA 251.

dation catalytic converters" (EPA Br. at 69, n. 66), EPA ignores at least one critical difference between the two devices. Converters *continuously burn* gaseous HC and CO while trap-oxidizers continuously *collect* particulate matter. In essence, particulates accumulate in the furnace until the next regenerative event is triggered by some signal or combination of signals designed to assure the safe and effective incineration of this fuel under controlled conditions. Postponement or indifference to the concerns presented by the use of trap technology under anticipated actual conditions of customer use (*see* GM Br. at 52-53) and the impact on lead time of the need to fully address these concerns is hardly what Congress must have intended by the requirement that the Agency give appropriate consideration to safety.[21]

III. EPA'S ATTEMPT TO JUSTIFY ITS TEST PROCEDURE THAT RESULTS IN "DOUBLE COUNTING" OF HYDROCARBON EMISSIONS IS FACTUALLY AND LEGALLY UNSUPPORTED

Rather than directly contesting GM's contention that the EPA emission test procedure including measurement of diesel particulates creates a fundamental unfairness for vehicle manufacturers because it erroneously results in measurement of an excessive amount of hydrocarbons in relation to the applicable standard, EPA circumvents this argument by asserting that GM is seeking a relaxation of the statutory HC standard, *e.g.*, EPA Br. at 101-103. For a number of reasons, EPA's attempted justification of ths unwarranted prejudicial effect of its measurement procedural must be rejected.

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[21] EPA's "extremely detailed" cost estimates (EPA Br. at 70), as noted in the GM Br. at 53, n. 28, were approximately three times too low. Further, EPA's assertion that GM's contentions were unsupported ignores evidence in the record indicating that EPA failed to include a number of specific components in its "detailed" estimate. GM Response at 178, JA 286. Further, several aspects of EPA's estimate were fashioned out of thin air. See Summary and Analysis at 76, JA 394. For several reasons, then, EPA's estimate of the economic burden on consumers and on the market is highly suspect and not the product of "appropriate consideration."

IN THE

United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA CIRCUIT

Nos. 80-1312 and Consolidated Cases
Nos. 80-1464, 80-1710 and 80-1712

NATURAL RESOURCES DEFENSE COUNCIL, INC., *et al. Petitioners,*

v.

DOUGLAS M. COSTLE, ADMINISTRATOR, ENVIRONMENTAL PROTECTION AGENCY, *et al. Respondents.*

On Petition For Review Of Actions Of The Administrator Of The Environmental Protection Agency

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C. The 1985 Model Year Particulate Standards For Light Duty Vehicles And Light Duty Trucks Are Consistent With Section 202(a)(3)(A)(iii) And Are Supported By The Record.

1. Light Duty Vehicles

Level of the Standard. As indicated above, the 1985 LDV diesel particulate standards were established pursuant to section 202(a)(3)(A)(iii). In relevant part, that section provides that the standards must be based on the use of a technology that "the Administrator determines will be available for the model year to which such standards apply. . . ." Perhaps redundantly, the section adds: "Such standards . . . shall take effect as expeditiously as practicable taking into account the period necessary for compliance."

The plain language of this section indicates that the Administrator is to "lead the target"; that is, he is required to promulgate standards based on technology that will be feasible in the future. Congress "intend[ed] the Administrator to make reasonable projections about the future availability of technology" and to promulgate standards that "will encourage research, development and improvement of technology".[41] This is precisely what he did.

It is likewise important to emphasize what section 202(a)(3)(A)(iii) does *not* require. Despite GM's implications to the contrary (Br. at 19), this section does not require,

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[41] 1977 House Report at 273, (discussing the "interim" heavy duty standards). As indicated above, the language of section 202(a)(3)(A)(iii) is identical to and was copied from the "interim" heavy duty vehicle standards provision in section 202(a)(3)(A)(i).

Opposition

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No. 81-201

IN THE

Supreme Court of the United States

OCTOBER TERM, 1981

GENERAL MOTORS CORPORATION,
Petitioner,

v.

ANNE M. GORSUCH, ADMINISTRATOR, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY,
Respondent.

On Petition For a Writ of Certiorari To The United States Court of Appeals For The District Of Columbia Circuit

BRIEF OF RESPONDENT NATURAL RESOURCES DEFENSE COUNCIL IN OPPOSITION TO THE PETITION

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QUESTIONS PRESENTED

1. Did the Court of Appeals correctly hold that the Clean Air Act authorizes the Environmental Protection Agency to establish standards for particulate emissions from diesel-powered automobiles and light trucks that require advances in status quo technology?

2. Did the Court of Appeals, applying the correct standard of review, properly uphold the diesel emission standards EPA established?

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Federal Communications Comm'n v. *National Citizens Committee for Broadcasting*, 436 U.S. 775 (1978)	14
Industrial Union Dep't., AFL-CIO v. *Hodgson*, 499 F.2d 467 (D.C. Cir. 1974)	13
International Harvester Co. v. *Ruckelshaus*, 478 F.2d 615 (D.C. Cir. 1973)	13
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Section 202(a)(2), 42 U.S.C. §7521(a)(2)	*passim*
Section 202(a)(3)(A)(iii), 42 U.S.C. §7521-(a)(3)(A)(ii)	*passim*
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LEGISLATIVE HISTORY:

S. Rep. No. 1196, 91st Cong., 2d Sess. (1970) 4,7,12

H.R. Rep. No. 1783, 91st Cong., 2d Sess. (1970) 4

H.R. Rep. No. 294, 95th Cong., 1st Sess. (1977) 10

reprinted in Legislative History of the Clean Air Act, Congressional Research Service (1974, 1978) 4,7,10,12

ADMINISTRATIVE MATERIALS:

Federal Register Notices

EPA, Suspension of 1975 Motor Vehicle Standards, 38 Fed. Reg. 10,317 (1973) 5

EPA, Proposed Standards for Particulate Emissions from Light-Duty Diesel Vehicles, 44 Fed. Reg. 6650 (1979) 11

EPA, Standards for Particulate Emissions from Light-Duty Diesel Vehicles, 45 Fed. Reg. 14,996 (1980) 7,8,11

EPA, Notice of Intent to Revise Regulations Bearing on the Automotive Industry, 46 Fed. 21,628 (1981) 10

EPA, Study of 1985 Light-Duty Diesel Vehicle Requirements, 46 Fed. Reg. 31,677 (1981) 10

Other Administrative Materials

EPA, Transcript, Motor Vehicles Pollution Control Suspension Hearings, March 12, 1973 5

EPA, Health Effects Associated with Diesel Exhaust Emissions: Literature Review and Evaluation (1978) 6

EPA, Regulatory Analysis: Light-Duty Diesel Particulate Regulations (1980) 6,7,8

Statement of EPA Administrator Costle on the New Diesel Auto Emission Standards (Feb. 21, 1980) ... 6

EPA, Compilation of Selected 1981 and 1982 Certification Results (Aug. 1981) 9

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MISCELLANEOUS:

Bruce Bykowski, Research Scientist, Southwest Research Inst., letter to Miles Buckman, Senior Research Engineer, Johnson-Matthey, Inc. (Sept. 1, 1981) 9

Edwin N. Cole, President, General Motors Corporation, letter to Robert W. Fri, Acting Administrator, EPA (May 9, 1973) 5

Paul King, Director of Engineering, Chevrolet Motor Div., General Motors Corporation, "Tomorrow's Product Engineering: Faster-Better," paper presented at the University of Michigan's 1981 Management Briefing Seminar, "The New U.S. Automotive Industry," Traverse City, Michigan (July 28, 1981) 10

George McGuire, Vice President, Johnson-Matthey, Inc., Testimony before the Senate Environmental and Public Works Committee (June 23, 1981) 9

National Academy of Sciences, Report of the Conference on Air Quality and Automotive Emissions (May 5, 1975), Supplementary Statement (July 29, 1975) 5

NATIONAL ACADEMY OF SCIENCES, CONTROLLING AIRBORNE PARTICLES (1980) 6

NATIONAL COMMISSION ON AIR QUALITY, TO BREATHE CLEAN AIR (1981) 8

Office of Management and Budget, Regulatory Expenditures of the Domestic Automotive Industry (May 1980) 8

PERERA & AHMED, RESPIRABLE PARTICLES: IMPACT ON HEALTH AND ENVIRONMENT (1979) 6

Patrick M. Raher, Hogan & Hartson, letter to Michael P. Walsh, Deputy Assistant Administrator, EPA (June 17, 1981) 9

Rodgers, *Benefits, Costs, and Risks: Oversight of Health and Environmental Decisionmaking*, 4 HARV. ENVIRONMENTAL L. REV. 191 (1980) 13

IN THE

Supreme Court of the United States

OCTOBER TERM, 1981

No. 81-201

GENERAL MOTORS CORPORATION,
Petitioner,

v.

ANNE M. GORSUCH, ADMINISTRATOR,
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY,
Respondent.

BRIEF IN OPPOSITION TO THE PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA CIRCUIT

INTERESTS OF RESPONDENT NATURAL RESOURCES DEFENSE COUNCIL

Natural Resources Defense Council, Inc., (NRDC) is a non-profit organization with more than 45,000 members nationwide dedicated to protecting public health and the natural environment, and to promoting an energy future that is both environmentally and economically sound. For 10 years, NRDC has worked for implementation of the Clean Air Act, including its provisions for protecting the public from dangerous motor vehicle pollution.

NRDC was a participant in the Environmental Protection Agency's two-year rulemaking proceeding on diesel emissions. This culminated in early 1980 with the issuance of standards for particulate matter emissions from 1985 diesel automobiles and

light trucks. General Motors and other automobile manufacturers brought suit before the U.S. Court of Appeals for the District of Columbia Circuit, seeking to weaken the standards or void them entirely. *General Motors Corp.* v. *Costle*, No. 80-1464; *Mercedes-Benz of North America* v. *Costle*, No. 80-1710. Natural Resources Defense Council intervened in these cases in support of EPA. NRDC appears before this Court as a respondent and files this brief in opposition to the petition for a writ of certiorari.

STATEMENT OF THE CASE

The Court of Appeals correctly rejected General Motors' attack on the 1985 standards for diesel particulate matter emissions. There is no error or important issue presented by the GM petition that warrants this Court's review.

General Motor's petition misrepresents the facts and issues involved in this case in three critical ways. First, GM fails to acknowledge the auto industry's historic reluctance to control pollution. GM attempts to deny the fundamental congressional decision that auto pollution controls must be improved at a quicker pace than the manufacturers would set for themselves. GM would negate the technology-forcing character of the Clean Air Act's provisions applicable to diesel particulate.

Second, GM glosses over the urgency of controlling diesel particulate in order to protect public health and the urban environment.

Third, GM seriously understates the advanced status of diesel control technology development by distorting the facts in the record. GM fundamentally misrepresents the diesel pollution control problem as one requiring serendipitous scientific discovery beyond the company's control, rather than just the application of its ample resources to a straightforward engineering task.

GM has also argued a biased selection of post-promulgation facts to this Court. The Environmental Protection Agency, however, is the proper body to consider alleged

new information. In fact, EPA has already opened proceedings to determine if the auto makers post-promugation claims have any merit.

Both the actions of the EPA and the decision of the Court of Appeals were carefully reasoned and well within their proper spheres. Indeed, EPA could not legally and reasonably have done less to control this growing hazard.

1. The History of Auto Pollution Control and the Policy of Technology-Forcing

GM's petition is really an attack on Congress' basic commitment, embodied in the Clean Air Act, to hasten the development and introduction of auto pollution controls beyond the leisurely pace the auto makers have set for themselves. The current controversy over diesel particulate—the fastest growing and potentially most dangerous form of vehicular pollution—is simply the latest episode in the industry's two-decade struggle against pollution controls.

Automobile pollution is a classic example of market failure requiring government intervention. Without the stimulus of regulation, the auto makers will not take significant steps on their own. Market forces alone provide them no economic incentives to install pollution controls. Indeed, market forces actually encourage the industry to downplay its capabilities, especially as to future models. Because of its highly concentrated and integrated structure, the industry has considerable leverage to control the resources devoted to developing pollution controls, and to manage the flow of data to the government and the public.[1]

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[1] These structural concerns led the Justice Department to bring suit in 1969 to prohibit overt cooperation among the four American manufacturers to restrain the development of emissions controls and the dissemination of data about them. The government and the auto makers reached a consent agreement forbidding (1) joint restraints on the date individual companies could introduce new control devices, (2) joint statements on pollution control to government agencies, (3) continued refusal to license technology except among themselves, (4)

(footnote continues)

To rectify the auto maker's failure to solve the pollution problem on their own, in 1970 Congress established the strong emission control provisions of the Clean Air Act. Section 202, 84 Stat. 1690, codified as amended, 42 U.S.C. §7521. Central to these provisions is the concept of "technology-forcing," setting standards for future model years beyond the status quo of existing technology. This strong legislation reflects Congress' determination that progress in auto pollution control would continue to be too slow if the pace of development were left solely in industry hands. See S. Rep. No. 1196, 91st Cong., 2d Sess. 23-24 (1970) (1970 Senate Report); H.R. Rep. No. 1783, 91st Cong., 2d Sess. 48-49 (1970) (1970 Conference Report), *reprinted in* 1 A LEGISLATIVE HISTORY OF THE CLEAN AIR AMENDMENTS OF 1970 at 423-24, 198-99 (1974). NRDC App. 1a-2a.[2]

The auto industry's negative economic incentives and its concentrated structure still pose problems, however. Because technological feasibility now is an issue in standard-setting, the industry has incentives to overstate technical difficulties. The auto makers have a clear history of so doing.

The most striking example involves the early development of the catalytic converter for gasoline engines. In March 1973, in proceedings to determine if EPA should postpone the statutory standards for 1975,[3] the auto makers strenuously

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(footnote continued)

exchanges among them of confidential emissions control information, and (5) joint assessment of technology and ideas offered them by outsiders. United States v. Automobile Mfrs. Ass'n, 1969 Trade Cases (CCH) 72,907 (C.D.Cal. 1969).

[2] See also statements of Senator Muskie, chief architect of the Act, in the Senate debate, 1 LEGISLATIVE HISTORY at 229. NRDC App. 2a-3a.

Reviewing other provisions of the Clean Air Act, this Court has recognized the technology-forcing nature of this law. Union Electric Co. v. EPA, 427 U.S. 246, 257, 268-69 (1976).

[3] As enacted in 1970, §202(b)(5)(A) of the Act authorized EPA to postpone the 1975 standards for one year. 84 Stat. 1691 (1970) (amended 1977).

contended catalysts were not durable and should not be considered available for 1975. In particular, GM predicted catastrophe unless the standards were changed.[4]

In April 1973 EPA granted the postponement. 38 Fed. Reg. 10,317 (1973). But within a month, GM reversed its public stand and proclaimed catalysts the "best choice."[5] In 1975, GM installed catalysts on its entire nationwide production after all.

A 1975 report of the National Academy of Sciences, prepared amid demands for further delays, concluded:

> There has been an apparent reluctance on the part of the manufacturers actually to assemble in a demonstration vehicle the component emission-control technologies which the manufacturers have in hand. In this way they can maintain with some consistency that the technology "has not been demonstrated" . . . .[6]

The history of exaggeration and reluctance cannot be ignored when evaluating GM's claims and the response to them by EPA and the Court of Appeals.

2. The Urgent Health and Environmental Need For Diesel Particulate Control

General Motors has failed to give the Court any indication of the urgency of promptly controlling diesel particulate emissions, which formed the basis for Congress' decision to regulate.

The diesel engine offers the nation a promise and a threat. On the one hand, it yields significant energy savings. But the

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[4] [I]f GM is forced to introduce catalytic converter systems across-the-board on 1975 business catastrophe and massive difficulties must be faced.

Transcript, Motor Vehicle Pollution Control Suspension Hearings, Mar. 12, 1973, at 29-30. NRDC App. 3a-4a.

[5] Letter from GM president Edwin Cole to Acting EPA Administrator Fri (May 9, 1973). NRDC App. 4a.

[6] National Academy of Sciences, Report of the Conference on Air Quality and Automobile Emissions (May 5, 1975), Supplementary Statement (July 29, 1975) at 6. NRDC App. 4a-7a.

growing volume of particulate emissions also poses a potentially very serious threat to public health.

Uncontrolled diesel autos emit 30 to 70 times more particulate matter than conventional gasoline cars. Moreover, the diesel fleet is growing rapidly. In the mid 1970s, diesels made up less than one half of one percent of the auto fleet. They now amount to about 10 percent of new car sales and are projected to reach 25 percent by 1990.[7] If not controlled, this particulate matter may cause thousands of cases of lung cancer and other serious respiratory diseases such as emphysema each year.

Diesel particles are of an especially dangerous sort. They are overwhelmingly in the small size range — less than 1/10,000th of an inch across — that is inhaled and lodged in the deepest part of the lungs. More than 10,000 chemicals ride on the particles' surfaces and can come off into contact with the most sensitive cells. Several dozen of these are already known to cause cancer, and many more are suspect.[8] See NRDC App. 8a.

In addition, uncontrolled diesel particulate emissions will drastically cut visibility in urban areas. How far one can see may be reduced by a third in eastern cities, and by *more than half* in western cities.[9]

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[7] EPA, Standard for Emission of Particulate, Regulation for Diesel-Fueled Light-Duty Vehicles and Light-Duty Trucks, 45 Fed. Reg. 14,496 (1980) [hereinafter cited as "Particulate Standards"]; EPA, Regulatory Analysis: Light-Duty Diesel Particulate Regulations at 2, 81-82 (1980) [hereinafter cited "Regulatory Analysis"].

[8] Particulate Standards, 45 Fed. Reg. at 14,499; Regulatory Analysis at 62-70. See EPA, "Health Effects Associated with Diesel Exhaust Emissions: Literature Review and Evaluation: at 126-29 (1978). See also Statement of EPA Administrator Costle on the New Diesel Auto Emission Standards, at 2 (Feb. 21, 1980).

On the health and environmental hazards of "fine" particulate, see generally, F. PERERA & A. K. AHMED, RESPIRABLE PARTICLES: IMPACT ON HEALTH AND ENVIRONMENT (1979).

[9] NATIONAL ACADEMY OF SCIENCES, CONTROLLING AIRBORNE PARTICLES, at 59 (1980).

Congress has sought particulate emission standards for more than a decade. 1970 Senate Report, at 24; 1 LEGISLATIVE HISTORY at 424. Dismayed by EPA's failure to act, in 1977 Congress added Section 202(a)(3)(A)(iii) to the Act, which specifically mandates particulate standards.[10]

To reduce the health and environmental hazards while still permitting the nation to gain the fuel savings of diesels, the Environmental Protection Agency established the particulate standards that are the subject of this case. 45 Fed. Reg. 14,496 (1981). The standards, set with more than four years lead time, limit particulate emissions from 1985 and later model diesel cars to 0.2 gram per mile (g/mi). Diesel light trucks are limited to 0.26 g/mi. This is a significant reduction, but it will still leave diesel particulate emissions 15 times greater than those from gasoline cars.[11]

By the auto makers' own choice, a device known as the "trap-oxidizer" will be used to meet the 1985 standards. The trap-oxidizer is for diesels what the catalytic converter is for gasoline-powered cars. It consists of a filter (in some designs resembling steel wool, in other designs a ceramic material) which can remove two-thirds or more of the particles from the exhaust. (A modern trap-oxidizer is pictured at NRDC App. 9a.) Periodically, the filter is heated to burn the particles off, mainly as carbon dioxide and water. These devices do not cut diesels' fuel economy and will cost less than the pollution controls on the counterpart gasoline-powered cars.[12]

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[10] To be sure, in the 1970s Congress focussed primarily on particulate matter from heavy-duty diesels, for they were then the principle source of diesel emissions. But as noted above, the use of diesel engines in autos is rapidly growing. Diesel cars are now a particulate emission source as important as trucks, and both need to be controlled. As we show *infra*, n. 20, the provisions of the Act apply to both.

[11] Regulatory Analysis at 98.

[12] *Id.* at 102, 122.

3. GM's Biased Portrait of the Status of Control Development

Though long on claims of impossibility, GM's petition is short on factual specifics. GM first attempts to convey the impression that the pace of development for trap-oxidizers is foreordained, unknown to the auto makers, and totally out of their control. But in fact, the development of these controls presents no new or novel scientific issues. As EPA stated:

> The improvements that are necessary are engineering problems, and are more a function of the resources allocated to the problem than any scientific or technical breakthrough.

45 Fed. Reg. at 14,498. The necessary resources are well within the capabilities of the world's largest auto maker, with its tremendous engineering resources. Indeed, the controls are being developed principally by the much smaller companies which designed and supply to the auto makers the catalytic converter used on gasoline cars.[13]

The one significant piece of record evidence that GM cites, it distorts. Concerning the Opel durability test, GM twice asserts that at 12,800 miles the trap "deteriorated and lost its effectiveness." GM Pet. at 8 n.7, 17. In fact, when GM chose to terminate the test, the filter was still removing 55 percent of the particles from the exhaust, nearly its original trapping efficiency.[14]

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[13] This effort does not pose any significant economic problem for the auto industry. In 1980, the Office of Management and Budget found that removing *all* air and water pollution control requirements on the industry, for both vehicles and factories, would lower the industry's capital requirements over the mid-1980s by only 3.5 percent. OMB, Regulatory Expenditures of the Domestic Automobile Industry (May 1980).

The National Commission on Air Quality, a presidential study group which reported this spring on the pollution control program, concluded: "[N]on-air-quality-related factors have been the primary cause of the domestic industry's current financial condition." To BREATHE CLEAN AIR, Finding 194, p. 29 (1981).

[14] Regulatory Analysis at 51.

GM makes further claims concerning events since the issuance of the standards a year and a half ago. This Court, of course, is not the body to hear these claims. The company must bring them first to EPA. But since GM has attempted to put these claims before the Court, it is necessary that we point out where the company's version of the facts is biased and inaccurate. GM says that circumstances have remained "virtually unchanged" since promulgation. Pet. at 9. This is not so.

The first half of EPA's rationale for the standards was the projection that by the 1983 model year, the auto makers could bring the particulate emission levels of even the worst-performing models down to 0.5 g/mi. In fact, the 1981 and 1982 certification vehicles for even the worst models are beating this target, with emissions below 0.4 and even 0.3 g/mi.[15] The performance required from trap-oxidizers in order to reach the 0.2 g/mi standard has thereby been lowered dramatically.

The second half of EPA's rationale, development of trap-oxidizers, is now entering the final stages on the schedule the Agency projected. Mercedes-Benz successfully completed a test of 54,000 kilometers (about 35,000 miles) with a ceramic trap-oxidizer.[16] Johnson-Matthey, one of the independent suppliers of emission control equipment, is now in the midst of a 50,000 mile test in Texas. More than 10,000 miles have been covered to date, with results satisfying the 1985 standards and no significant deterioration with mileage.[17] Things are much further along than GM would have the Court know.

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[15] EPA, Compilation of Selected 1981 and 1982 Certification Results (Aug. 1981).

[16] Letter from Patrick M. Raher, Hogan & Hartson (representing Mercedes-Benz), to Michael P. Walsh, Deputy Assistant Administrator, EPA (June 17, 1981).

[17] Testimony of George McGuire, Vice President, Johnson-Matthey, Inc., before the Senate Committee on Environment and Public Works (June 23, 1981); Letter from Bruce Bykowski, Research Scientist, Southwest Research Inst., to Miles Buckman, Senior Research Engineer, Johnson-Matthey, Inc. (Sept. 1, 1981) (submitted to EPA in Sept. 1981).

GM contends nonetheless that not enough lead time remains. But according to the Director of Engineering for Chevrolet, the company is now capable of designing a *whole new engine*, from scratch to mass production, in two years. This includes the time necessary for obtaining from EPA the necessary certification of compliance with emission standards.[18]

Despite the progress to date, at the auto makers' behest EPA under the new Administration has opened wide-ranging proceedings to hear their post-promulgation claims. EPA is considering proposals to weaken the standards either by raising the allowable emissions or by permitting the manufacturers to average the emissions of their dirtier vehicles with their cleaner ones. 46 Fed. Reg. 21,628; 46 Fed. Reg. 31,677 (1981). GM will have an ample opportunity to make its arguments before EPA, and to obtain judicial review if it is not satisfied by the Agency's decision.

ARGUMENT

I. DIESEL STANDARDS THAT REQUIRE ADVANCES IN TECHNOLOGY ARE AUTHORIZED BY THE CLEAN AIR ACT

EPA's authority to set emission standards for motor vehicles derives from Section 202(a) of the Clean Air Act, 42 U.S.C. §7521(a). This section contains both general authority dating from 1970 to control any pollutant that "may reasonably be anticipated to endanger" health or the environment, §§202(a)(1) & (2),[19] and specific mandates added in 1977 on

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[18] Paul King, Dir. of Engineering, Chevrolet Motor Div., General Motors Corp., "Tomorrow's Product Engineering: Faster—Better," paper presented at the University of Michigan's 1981 Management Briefing Seminar, "The New U.S. Automotive Industry," Traverse City, Michigan (July 28, 1981).

[19] As enacted in 1970, §202(a)(1) directed EPA to regulate pollutants that "endanger" the public health or welfare. 84 Stat. 1690. In 1977 Congress changed this to the present language, to emphasize EPA's duty to take precautionary action to prevent harm before it occurs. See the House Report, H.R. Rep. No. 294, 95th Cong., 1st Sess. 43-51 (1977), reprinted in 4 LEGISLATIVE HISTORY at 2510-18.

problems EPA had not yet dealt with, §§202(a)(3)-(6). Section 202(a)(3)(A)(iii) directs EPA to set standards "under paragraph (1) of this subsection" — i.e., under §202(a)(1) — for particulate emissions from "classes or categories of vehicles." EPA, relying on the plain, unrestrictive language of this last phrase, acted under §202(a)(3)(A)(iii).

The Court of Appeals held that EPA could not act under §202(a)(3)(A)(iii), but it sustained the standards under the general provisions, §§202(a)(1) & (2). *Natural Resources Defense Council* v. *Costle*, Slip op. at 15-17, 19, 37, GM App. 15a-17a, 19a, 37a.[20] GM concedes that diesel standards may be set under the general provisions,[21] but now contends standards set under those provisions may not require advances in the status quo technology. That contention is wrong.

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[20] Because the Court of Appeals upheld the standards under the general provisions, NRDC had no reason to seek rehearing below or review by this Court of the lower court's construction of §202(a)(3)(A)(iii). But because GM's petition is built on that construction, it is necessary for us to address it. We believe the Court of Appeals erred in construing §202(a)(3)(A)(iii) not to authorize standards for light-duty diesel vehicles.

The terms of §202(a)(3)(A)(iii) do not restrict the type of vehicles to which the provision applies. The statutory language itself supports EPA's position. "Vehicles" is unmodified and unrestricted.

Throughout the entire rulemaking, EPA interpreted this provision as applicable to autos as well as trucks. 44 Fed. Reg. 6650 (1979) (proposal); 45 Fed. Reg. 14,496 (promulgation). No participant challenged this position at any point in these proceedings. GM first argued otherwise in its *reply* brief below.

Especially since no one objected, EPA certainly was reasonable in following the plain meaning of the law. Caminetti v. United States, 242 U.S. 470, 485 (1917); Ernst & Ernst v. Hochfelder, 425 U.S. 185, 197 (1976). At most, the legislative history renders the provision's applicability ambiguous. In those circumstances, the Court of Appeals should have deferred to EPA's reasonable and consistent application of the statute it is charged with implementing. Train v. Natural Resources Defense Council, 421 U.S. 60, 75, 87 (1975).

Thus since the standards in fact are authorized under §202(a)(3)(A)(iii), as well as under the general provisions of §§202(a)(1) and (2), GM has no basis for a remand.

[21] GM has also conceded that EPA made all the necessary threshold findings concerning significant danger to public health. *See* Slip op. at 16-17, GM App. 16a-17a.

The Court of Appeals correctly held that Congress intended standards under §§202(a)(1) and (2) to be technology-forcing. As the 1970 Senate Report stated: "[EPA] is expected to press for the development and application of improved technology rather than be limited by what exists today." S. Rep. No. 1196, 91st Cong., 2d Sess. 24 (1970), NRDC App. 1a. *See* Slip op. at 19, GM App. 19a.

GM purports to find a bar against technology-forcing in the terms of §202(a)(2). GM Pet. at 11, n.7. But none of the words and phrases GM highlights carries the restrictive meaning the company would breathe into them. All are consistent with the clear legislative history instructing EPA to set standards that advance technology at a more rapid pace than the auto makers would choose for themselves. In this respect, there is no significant difference in EPA's authority under the general provisions of §§202(a)(1) and (2) and the specific provisions of §202(a)(3)(A)(iii).

By the terms of §202(a)(3)(A)(iii) itself, EPA's standards were set "under paragraph (1) of this subsection," i.e., under §202(a)(1). Because the specific authority EPA cited is a subset of the Agency's more general authority, and because there is no significant difference between them regarding technology-forcing, the Court of Appeals was correct to sustain the standards.

II. THE COURT OF APPEALS, APPLYING THE CORRECT STANDARD OF REVIEW, PROPERLY SUSTAINED THE STANDARDS

A. The Court Below Applied the Correct Standard of Review

GM asserts that the standards are defective under the applicable arbitrary or capricious test[22] because they are not based solely on "record evidence." This is no more than a back door attempt to nullify the technology-forcing mandate of the Clean Air Act's provisions.

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[22] Clean Air Act §307(d)(9)(A), 42 U.S.C. §7609(d)(9)(A).

Setting standards under such a mandate requires EPA to make reasoned projections of future improvements in technology that can be achieved within the available lead time. This necessarily involves more than the traditional sort of fact-finding from record evidence. It requires analysis of and extrapolation from this evidence, applying the Agency's technical expertise, to determine how far the technology can be advanced in a given time. If EPA were not allowed to make such judgments, on the grounds that they cannot be fully supported by evidence of past technological achievements alone, then the Agency's authority to set standards that require advances in control technology would be effectively stripped away.

Over the last decade, the Court of Appeals has developed sound criteria for assuring that EPA states the basis and reasons for its projections, including reasons for rejecting objections posed by commenters, in a reasoned manner. The lower court has been careful to assure that EPA supports with record evidence the facts susceptible to this kind of proof, and that the Agency thoroughly explains the basis for its projections beyond that data. But the Court of Appeals also has avoided tests that would block implementation of mandates to require advancement of control technology. It has sought to observe the line "where the close justification of methodology leaves off and the discretion to make policy on matters of uncertainty begins."[23]

Prior cases make clear that EPA's projections concerning future technical feasibility necessarily involve a large element of policy judgments made to resolve unavoidable uncertainties. Without the authority to make such judgments, the Agency could not fulfill its mandate. See *International Harvester Co.* v. *Ruckelshaus*, 478 F.2d 615, 630 (D.C. Cir. 1973). See also *Industrial Union Dep't, AFL-CIO* v. *Hodgson*, 499 F.2d 467, 474-76 (D.C. Cir. 1974) (involving the similar provisions of the Occupational Safety and Health Act), cited with approval

[23] Rodgers, *Benefits, Costs, and Risks: Oversight of Health and Environmental Decisionmaking*, 4 HARV. ENVIRONMENTAL L. REV. 191, 224 (1980).

by this Court in *Federal Communications Comm'n v. National Citizens Committee for Broadcasting*, 436 U.S. 775, 814 (1978).

Contrary to GM's claims, the opinion below falls squarely within the doctrine of these cases. The Court of Appeals carefully analyzed the nature of the projection EPA must make and the nature of the uncertainties it must deal with. The court required EPA to answer any particularized objections raised by the auto makers. But it refused to allow the companies to block EPA's implementation of the law's technology-forcing mandate simply by speculating potential problems in a conclusory manner and claiming they have no idea how to solve them. Slip op. at 18-27, GM App. 18a-27a.

B. The 1985 Standards Are Based On A Reasoned Projection Well Within EPA's Discretion

The Court of Appeals carefully analyzed each of the auto makers' objections to the 1985 standards and the answer given to it by EPA. In each case, the court held that EPA had thoroughly considered their claims and had given the best answer possible with the data then available. The court refused the invitation to find purely speculative difficulties or gaps in the data a sufficient basis for overturning the standards. Slip op. at 27-37, GM App. 27a-37a.

The specific objections GM brought to the Court of Appeals were adequately answered by EPA. As discussed *supra* at 8, GM's claims regarding the 12,800 mile durability test are distorted. Slip op. at 29, GM App. 29a. GM's other specific objections were carefully addressed by both the Agency and the Court of Appeals. Slip op. at 25-26, GM App. at 25a-26a.

The Court of Appeals made clear that if the speculated future problems actually later arose, the auto makers could obtain reconsideration from EPA. There was, and remains, sufficient time to make adjustments, if warranted, without significant hardship on the manufacturers. But if the standards could be aborted this early simply by predictions of failure, such predictions would be rendered self-fulfilling. Slip. op. at 26, GM App. at 26a.

EPA has already opened just such proceedings to consider the auto makers' post-promulgation objections. This is the proper course for GM to follow now. The company has advanced no basis for review by this Court.

CONCLUSION

There is no legal or factual error in the opinion below that warrants this Court's review. The petition for the writ of certiorari should be denied.

Respectfully submitted,

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Natural Resources
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October 1, 1981

APPENDIX

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1970 Senate Report, S. Rep. No. 1196, 91st Cong., 2d Sess. 23-24; *reprinted in* 1 LEGISLATIVE HISTORY OF THE CLEAN AIR AMENDMENTS 423-24 (Congressional Research Service 1974, 1978):

SECTION 202. ESTABLISHMENT OF STANDARDS

Title II of the Clean Air Act has been revised to provide additional authority to the Secretary to regulate sources of pollution which move or may move in interstate commerce, or which contribute to endangerment of the health and welfare of the people of the United States.

* * *

The existing law requires the Secretary to establish standards on the basis of economic and technological feasibility. The proposed bill would require the Secretary to make a judgment on the contribution of moving sources to deterioration of air quality and establish emission standards which would provide the required degree of control. The Secretary is expected to press for the development and application of improved technology rather than be limited by that which exists. In other words, standards should be a function of the degree of control required, not the degree of technology available today.

* * *

It is expected that section 202(a) authority would be used for regulation of particulate emissions. No present measurement techniques exist to evaluate or establish standards for such particulate emissions. Such standards cannot be established on the basis of 1970 vehicles as required by subsection (b) because measurement techniques will not exist until 1972. At such time as measurement methods are developed the Secretary would be expected to establish standards for particulate emissions under 202(a) authority.

1970 Conference Report, H.R. Rep. No. 1783, 91st Cong., 2d Sess. 48-49, *reprinted in* 1 LEGISLATIVE HISTORY at 198-99:

SECTION 202. ESTABLISHMENT OF STANDARDS

The House bill did not amend the provisions of existing law relating to the establishment of standards for new motor vehicles. The Senate amendment deleted the requirements that such standards be based on a test of technical and economic feasibility, and provided statutory standards for passenger cars and required that such standards be achieved by a date certain. The Senate bill also provided that the statutory deadline could be extended for not more than one year if the Administrator made a series of specified findings. The Senate bill also authorized the Administrator to set standards of emission performance for vessels, commercial vehicles, and aircraft. (The House bill treated aircraft emissions in a different section.)

The conference substitute follows substantially the Senate amendments. . . .

Statement of Senator Edmund S. Muskie, in Senate Debate on the Clean Air Act (Sept. 21, 1970) *reprinted in* 1 LEGISLATIVE HISTORY at 229:

Mr. President, I should like to make the philosophy of the bill clear, with this emphasis:

Predictions of technological impossibility or infeasibility are not sufficient as reasons to avoid tough standards and deadlines, and thus to compromise the public health. The urgency of the problems requires that the industry consider, not only the improvement of existing technology, but also alternatives to the internal combustion engine and new forms of transportation. Only a clear cut and tough public policy can generate this kind of effort.

This philosophy has been stated by the committee before. In reporting the Air Quality Act of 1967 to the Senate, the committee said:

> The Committee recognizes the potential economic impact, and therefore economic risk, associated with major social legislative measures of this type. But this risk was assumed when the Congress enacted social security, fair labor standards, and a host of other legislation designed to protect the public welfare. Such a risk must again be assumed if the nation's air resources are to be conserved and enhanced to the point that generations yet to come will be able to breathe without fear of impairment of health.

Detroit has told the Nation that Americans cannot live without the automobile.

This legislation would tell Detroit that if that is the case, they must make an automobile with which Americans can live.

Statement of General Motors Corp., Transcript, Environmental Protection Agency Motor Vehicle Pollution Control Suspension Hearings at 24, 29-30 (Mar. 12, 1973).

> [S]ince neither component development nor process development will have had the benefit of the usual testing procedures, our experience tells us serious unforseen production problems are very probable. . . .
>
> * * *
>
> The result is that if GM is forced to introduce catalytic converter systems across-the-board on 1975 models, the prospect of an unreasonable risk of business catastrophe and massive difficulties with these vehicles in the hands of the public must be faced.

> It is conceivable that complete stoppage of the entire production could occur, with the obvious tremendous loss to the company, shareholders, employees, suppliers, and communities. Short of that ultimate risk, there is a distinct possibility of varying degrees of interruption with sizable dislocations.

Letter from Edward N. Cole, President, General Motors Corporation, to Robert W. Fri, Acting Administrator, Environmental Protection Agency (May 9, 1973):

> We should emphasize that the reason we requested a phase-in of our advanced control systems in 1975 is because this is a logical and proven technique for introducing new technology, and not because of uncertainty about the concept of reducing emissions by an after-treatment system. In our ongoing development and testing programs, we are finding that the GM catalytic converters are providing good emission control efficiency and durability. Our cars equipped with them are showing driveability and fuel economy characteristics at least as good as our 1973 models. We can hope to make still more progress in these areas. At the present time, we firmly believe that the catalytic converter presents the best choice of available alternatives for achieving the required emission levels in most automobiles in the time frame required.

National Academy of Sciences, Report of the Conference on Air Quality and Automobile Emissions (May 5, 1975), Supplementary Statement (July 29, 1975) at 6-8:

> There has been an apparent reluctance on the part of the manufacturers actually to assemble in a demonstration vehicle the component emissions-control technologies which the manufacturers have in hand. In this way they can maintain with some consistency that the required technology "has not

been demonstrated", an interpretation which EPA has consistently rejected. Some examples from EPA's "Automobile Emission Control: The Technical Status and Outlook as of December 1974":

p. 7-19 "In the opinion of the report team, the program has been delayed because of Ford's reluctance to demonstrate that the 0.4 NOx level can be achieved while requesting an emissions standard moratorium."

p. 7-24 "Ford's efforts with independent developers of systems with potential for 0.4 NOx capacity has been minimal in the past year. Ford learned of the Gould GEM 68 getter system in February 1974. Currently, almost one year later, Ford reported no tests on such a vehicle. Ford has tested a Questor system in the past year and typical of most automobile manufacturers' relationships with independent developers, the vehicle was tested, something was found to be wrong with it, and the vehicle was returned to Questor to have them fix it."

p. 7-39 "Gould's in-house durability programs have always shown substantially better performance than any programs involving an automobile manufacturer. Testing at the automakers has often resulted in catastrophic catalyst failures due to total ignition failures and some unexplained events. In the summer of 1974, for example, Gould delivered a vehicle to Chrysler for testing which had met the 1976 levels at Gould's laboratory in Cleveland. Table 7.2.1.4 is a listing of the events which occurred with the vehicle (car 178):

1. Car delivered to Chrysler by Gould.
2. Chrysler experiences misfire en route to proving ground for emission testing.
3. Chrysler mechanic experiences total ignition failure at speed while looking for problems with car.

4. Catalysts returned to Gould for checking. X-ray analysis and steady state efficiency tests are okay.

5. Chrysler re-installs catalyst on test car, runs out of gas on emission test due to fuel weight system foul up.

6. Chrysler takes car to proving round. Experience two ignition failures and runs out of gas in first 12 hours of testing.

7. Car is sent back to Chrysler engineering, runs out of gas again on emission test.

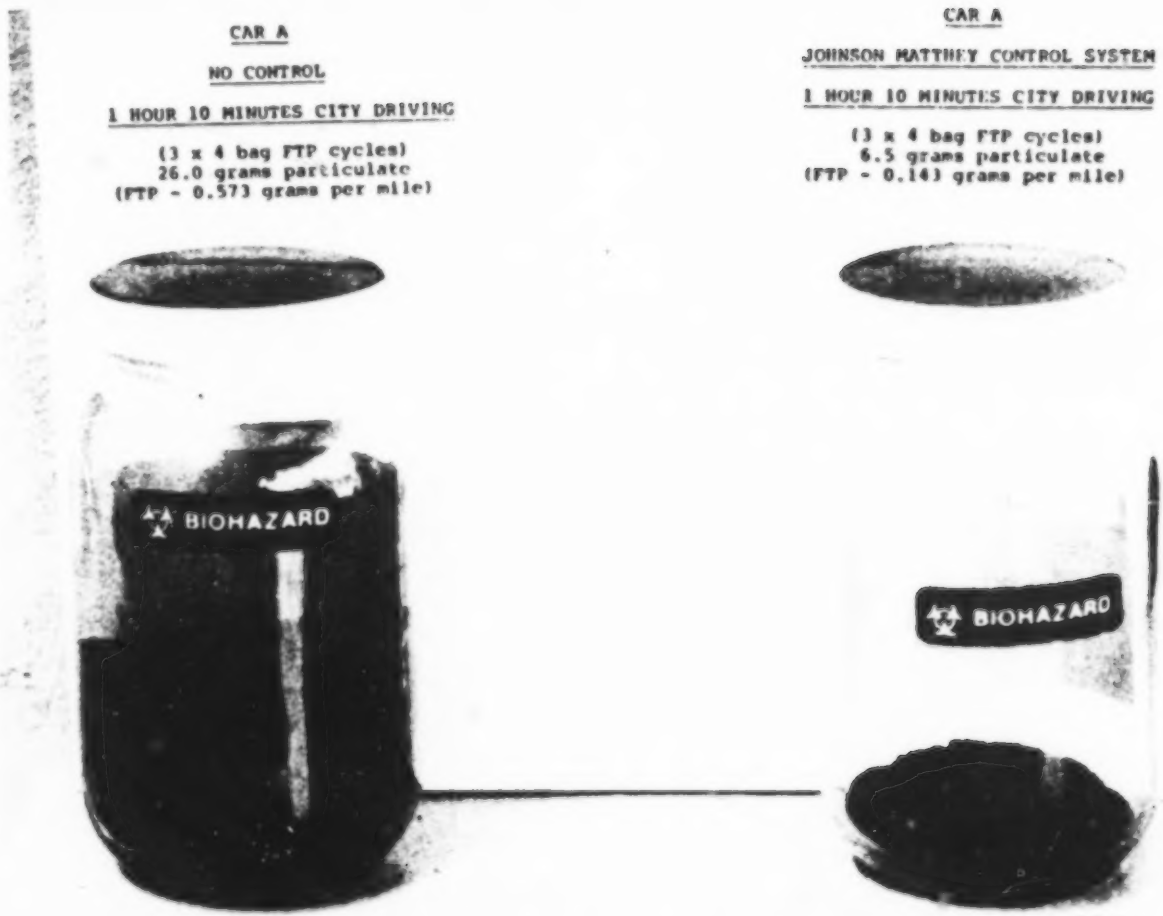
8. Damaged catalysts are returned to Gould."

p. 7-42 "A problem has been that the demonstration of a Dresserator (an advanced carburetor) in combination with other advanced emission control systems has not been pursued by any manufacturer. A "Dresser with catalyst" demonstration would take all of one week to accomplish but has not yet been reported."

p. 7-51 "Questor's major problem is that the support needed to further optimize the system is unavailable to them. Often cooperative programs with auto manufacturers are stalled when Questor is unable to prove to a manufacturer that their system can meet the 1978 level on durability. Cars are often returned to Questor for relatively simple problems which any competent manufacturer should be able to quickly solve by himself. No manufacturer has stepped in and developed the improved fuel metering and air modulation systems needed to further optimize the emissions and economy of the Questor system. The report team estimates the Questor system is mass producible and certifiable at the 1978 statutory levels by model year 1978. Some fuel economy loss relative to 1975 would, however, be anticipated since the improved control approaches needed to further optimize the system may not be available by 1978 even if

aggressive development toward such a goal is begun now."

p. 7-121 "The oxygen sensor now has durability satisfactory to Volvo (more than 12,000 miles), and several promising 3-way catalysts have been tested. Volvo's catalyst aging tests shown a new catalyst had better efficiencies for HC, CO and NOx than any catalyst Volvo has tested to date, but no car data were mentioned. Another progress area for Volvo has been catalyst mechanical durability which they now feel is adequate. Volvo is one of the few manufacturers continuing to make a reasonable effort to meet 0.4 NOx, in the opinion of the report team, and no manufacturer has a better chance with the 3-way approach."



Diesel fine particulate matter recovered from vehicles run for 1 hr. 10 minutes. Left: vehicle equipped with no controls. Right: vehicle equipped with trap-oxidizer.

A modern trap-oxidizer for diesel particulate control (cut-away view).

Opposition

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No. 81-201

In the Supreme Court of the United States

OCTOBER TERM, 1981

GENERAL MOTORS CORPORATION, PETITIONER

v.

ANNE M. GORSUCH, ADMINISTRATOR,
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

ON PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA CIRCUIT

BRIEF FOR THE RESPONDENT IN OPPOSITION

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QUESTIONS PRESENTED

1. Whether the court of appeals erred by not remanding to the Administrator of the Environmental Protection Agency to reconsider its regulation to control particulate emissions from diesel-powered passenger cars and light-duty trucks which the court held had been promulgated incorrectly pursuant to Section 202(a)(3)(A)(iii) of the Clean Air Act, but which the court also found could have been promulgated properly pursuant to Section 202(a)(1) and (2) of the Act.

2. Whether the criteria adopted by the court of appeals for determining the reasonableness of the Administrator's prediction of the technological feasibility of the emission standards for 1985 for diesel-powered passenger cars and light-duty trucks was consistent with the "arbitrary and capricious" standard of judicial review.

3. Whether the court of appeals correctly found that the administrative record supported the Administrator's conclusion that the particulate standards applicable to 1985 model-year passenger cars and light-duty trucks are technologically feasible.

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Statute:

Clean Air Act, 42 U.S.C. (Supp. III) 7401 *et seq.* :

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ANNE M. GORSUCH, ADMINISTRATOR,
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ON PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA CIRCUIT

BRIEF FOR THE RESPONDENT IN OPPOSITION

OPINION BELOW

The opinion of the court of appeals (Pet. App. 1a-58a) is reported at 655 F. 2d 318.

JURISDICTION

The judgment of the court of appeals was entered on April 22, 1981. A timely petition for rehearing and suggestion for rehearing en banc was denied on May 27, 1981 (Pet. App. 59a-62a). The petition for a writ of certiorari was filed on July 31, 1981. The jurisdiction of this Court is invoked under 28 U.S.C. 1254(1).

STATUTE INVOLVED

Section 202(a)(1) and (2) of the Clean Air Act, 42 U.S.C. (Supp. III) 7521(a)(1) and (2), provides:

(a) Except as otherwise provided in subsection (b)—

(1) The Administrator shall by regulation prescribe (and from time to time revise) in accordance with the provisions of this section, standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines, which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare. Such standards shall be applicable to such vehicles and engines for their useful life (as determined under subsection (d), relating to useful life of vehicles for purposes of certification), whether such vehicles and engines are designed as complete systems or incorporate devices to prevent or control such pollution.

(2) Any regulation prescribed under paragraph (1) of this subsection (and any revision thereof) shall take effect after such period as the Administrator finds necessary to permit the development and application of the requisite technology, giving appropriate consideration to the cost of compliance within such period.

Section 202(a)(3)(A)(iii) of the Clean Air Act, 42 U.S.C. (Supp. III) 7521(a)(3)(A)(iii), provides:

The Administrator shall prescribe regulations under paragraph (1) of this subsection applicable to emissions of particulate matter from classes or categories of vehicles manufactured during and after model year 1981 (or during any earlier model year, if practicable). Such regulations shall contain standards which reflect the greatest degree of emission reduction achievable through the application of technology which the Administrator determines will be available for the model year to which such standards apply, giving appropriate consideration to the cost of applying such

technology within the period of time available to manufacturers and to noise, energy, and safety factors associated with the application of such technology. Such standards shall be promulgated and shall take effect as expeditiously as practicable taking into account the period necessary for compliance.

STATEMENT

1. One of the effects of the increased demand in recent years for more fuel-efficient cars has been a dramatic increase in the use of diesel-powered cars and light-duty trucks. Unfortunately, diesel-fueled engines pose a unique health risk. They emit approximately 30 to 70 times the amount of particulate matter that is emitted by gasoline-fueled engines equipped with catalytic converters (Pet. App. 77a). Because diesel particulate matter is especially small in size,[1] it is much more likely to be deposited in the alveolar region of the human respiratory system than larger particles, and also requires much longer periods of time to be cleared from the respiratory tract (Pet. App. 86a). Of even greater concern is the fact that evidence suggests that certain organic substances in diesel particulate are mutagenic, and may cause cancer in humans.[2]

As a measure of its concern over the health risks from diesel particulate emissions (see S. Rep. No. 95-127, 95th Cong., 1st Sess. 67 (1977)), Congress in 1977 added to the Administrator's existing broad authority to set emission standards for motor vehicles in Section 202(a)(1) and (2) of

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[1]All diesel particulate is smaller than 15 micrometers in diameter; 97% is less than 2.5 micrometers in diameter. 45 Fed. Reg. 14499 (1980) (Pet. App. 86a).

[2]"Regulatory Analysis—Light-Duty Diesel Particulate Regulations" 70 (Feb. 20, 1980) (hereinafter "Regulatory Analysis"); J.A. 549. "J.A." refers to the joint appendix filed with the court of appeals. A copy has been lodged with the Clerk of this Court for the Court's convenience.

the Clean Air Act, 42 U.S.C. (Supp. III) 7521(a)(1) and (2), the requirement that he prescribe standards for emissions of particulate matter from 1981 and later model year vehicles. Section 202(a)(3)(A)(iii) of the Act, 42 U.S.C. (Supp. III) 7521(a)(3)(A)(iii).[3]

2. In view of projections that diesel-powered cars would account for 25% of the entire passenger car market by 1985, the Administrator on February 1, 1979 proposed to establish standards for particulate emissions from diesel-fueled, light-duty passenger cars and light-duty trucks. 44 Fed. Reg. 6650. The Administrator proposed standards of 0.6 grams per mile (gpm) beginning with model-year 1981 vehicles, and 0.2 gpm beginning with model-year 1983 vehicles.

On March 5, 1980, after considering extensive public comments on the proposal, the Administrator promulgated final standards of 0.6 gpm for 1981-1984 model year diesel-powered cars, and 0.2 gpm for 1985 and later model year cars. 45 Fed. Reg. 14496 (Pet. App. 75a-105a).[4] The Administrator concluded that to meet the 1985 standards manufacturers would have to employ some type of after-treatment technology, most likely a "trap-oxidizer" (Pet. App. 81a). A trap oxidizer consists of a trap (or filter) which catches particulate matter in the exhaust gas stream and a mechanism to oxidize (burn) the collected particulate matter in order to regenerate the trap and thereby maintain its collection efficiency. *Ibid.*

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[3]As is discussed, *infra*, the court of appeals in the instant case concluded that this provision applied only to heavy-duty vehicles (Pet. App. 11a-15a).

[4]The Administrator also adopted a standard of 0.6 gpm for 1982-1984 model year light-duty, diesel-powered trucks; a standard of 0.26 gpm was promulgated for 1985 and later model year light-duty trucks, because of their greater weight and road load (Pet. App. 84a-85a). Only the 1985 standards are, however, at issue in this case.

Although no fully usable trap-oxidizer had been developed and tested successfully at the time the rule was adopted, the Administrator was nonetheless "convinced" that trap-oxidizers were a feasible solution to the particulate emissions problem (Pet. App. 100a). Based on information gathered from manufacturers, including petitioner, and others, the Administrator found that the basic technology for trap-oxidizers was well understood,[5] and that only engineering and design selection tasks remained to refine trap-oxidizer technology (Pet. App. 82a-83a).

Based on the relatively straightforward tasks remaining, the considerable advances in the necessary technology made in recent years, and the manufacturers' comments, including those of petitioner, the Administrator found a "strong likelihood" that trap-oxidizers could be installed on cars by the 1984 model year (Pet. App. 83a). The Administrator wanted to ensure, however, that manufacturers had ample lead time to perfect the technology and to apply it economically to all light-duty, diesel-powered vehicles. Therefore, the Administrator gave manufacturers until the 1985 model year to meet the 0.2 standard. This represented, from publication of the final rule to the effective date of the standards, two to two and one-half years of development lead time, and two to two and one-half years of additional production lead time (Pet. App. 83a).

Moreover, in setting the standard at 0.2 gpm, the Administrator sought to ensure that no diesel-powered cars would be forced out of production. He therefore deliberately

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[5]The Administrator found that materials had been identified that could achieve the necessary collection efficiency, and that manufacturers had identified engine throttling (a technique of reducing the oxygen supply to the engine), as a means of incinerating the trapped particulate matter (Pet. App. 81a-82a).

established the standard based on the lowest level of reduction achievable by the "dirtiest" diesel engine (Pet. App. 153a-154a).

3. Petitioner and others[6] challenged the particulate regulations in the United States Court of Appeals for the District of Columbia Circuit, claiming, *inter alia*, that the 0.2 gpm standard was too strict. More particularly, petitioner argued that the standard was infeasible because the technology needed to achieve the standard—the trap-oxidizer—had not yet been developed.

The court of appeals upheld the regulations in their entirety. It held: (1) that the regulations were not authorized by Section 202(a)(3)(A)(iii) of the Act, which was adopted for heavy-duty vehicles, but that the EPA had ample authority to adopt particulate emission standards under the broad grant of power in Section 202(a)(1) and (2) of the Act (Pet. App. 10a-17a); and (2) that the administrative record supported fully the technological feasibility of the 0.2 gpm standard, considering the lead time available to manufacturers for achieving the standards (Pet. App. 17a-37a). The court therefore concluded that the Administrator's decision satisfied the "arbitrary and capricious" standard of judicial review.

ARGUMENT

The decision of the court of appeals is not inconsistent with any principles announced by this Court or any other court of appeals and is a proper application of relevant law.

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[6]The other parties were Mercedes-Benz of North America, Inc., Automobiles Peugeot, Volkswagen of America, Inc., and Natural Resources Defense Council, Inc. (NRDC). NRDC challenged the standards as not being stringent enough to satisfy Section 202(a)(3)(A)(iii) of the Clean Air Act. In addition, NRDC challenged the Administrator's decisions to grant waivers of the nitrogen oxides (NOx) standards under Section 202(b)(6)(B) of the Act, 42 U.S.C. (Supp. III) 7521(b)(6)(B).

Moreover, the EPA has initiated proceedings to reexamine the feasibility of the particulate standard at issue and therefore petitioner may well obtain administratively all the relief it requests from this Court. Accordingly, further review of the decision of the court of appeals is unwarranted.

1. Petitioner first argues (Pet. 9-16) that the court of appeals erred by not remanding to the Administrator once it determined that the regulation was not expressly authorized by Section 202(a)(3)(A)(iii) of the Act—the provision cited by the Administrator in promulgating the standards for light-duty vehicles. Petitioner does not claim that the Administrator lacked authority under Section 202(a)(1) and (2) of the Act, but instead argues that under this Court's decision in *SEC* v. *Chenery Corp.*, 318 U.S. 80 (1943), once a reviewing court has determined that an administrative agency has committed any legal error, a remand must follow.

Contrary to petitioner's assertion, no such inflexible rule exists. This Court has recognized that "*Chenery* does not require that we convert judicial review of agency action into a ping-pong game." *NLRB* v. *Wyman-Gordon Co.*, 394 U.S. 759, 766-767 n.6 (1969). Instead, the rule in *Chenery* is a product of its particular situation, viz., an adjudication of very complex facts based on an improper legal standard. That is not the instant case. Here, we are concerned with an administrative rule adopted through notice and comment procedures which, although not required by the provision cited by the Administrator, is clearly authorized by the statute. In this situation, a remand is appropriate only if there is serious reason to believe that the rule as adopted was significantly affected by the source of authority relied upon by the agency.

The record in this case makes clear, and the court of appeals so found (Pet. App. 17a n.16), that the choice of the 0.2 gpm standard and the choice of 1985 as the year of

implementation were based on the Administrator's general assessment of the health risks involved and the feasibility of the trap-oxidizer technology and not on the mandate of any particular section of the Clean Air Act. This conclusion is best illustrated by examining the Administrator's findings in relation to the two pertinent sources of authority at issue.

The first distinction is that Section 202(a)(1) authorizes regulation of pollutants emitted by motor vehicles which, "in [the Administrator's] judgment, cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare," whereas Section 202(a)(3)(A)(iii) does not require this threshold finding. Instead, the latter provision simply directs the Administrator to "prescribe regulations * * * applicable to emissions of particulate matter from classes or categories of vehicles manufactured during and after model year 1981."

The court of appeals found that a remand was unnecessary on this issue because the Administrator had fully considered the health effects of diesel particulate before proceeding with rulemaking (Pet. App. 16a-17a). Moreover, the court below, quoting from petitioner's reply brief, observed that petitioner had conceded as much (Pet. App. 17a; emphasis added):

> Indeed, GM expressly concedes in its brief that "the Administrator considered and discussed the health risks of particulate emissions during rulemaking [and that his] determination that particulate emissions require priority control to protect human health *would entitle him to prescribe particulate standards under § 202(a)(1) for light-duty vehicles.*"

Petitioner also argues (Pet. 9-11) that the 1985 particulate standard might have been less stringent if EPA had recognized Section 202(a)(1) and (2) as the source of its authority, contending that these provisions, unlike Section

202(a)(3)(A)(iii), do not permit "technology-forcing" standards. Petitioner has changed its position since the court of appeals rendered its decision.[7] Before the court of appeals, petitioner took the view that the statutes' requirements with regard to emission standards were essentially the same. Petitioner argued (Reply Br. 6; emphasis added):

> Standards promulgated under § 202(a)(1), *like standards prescribed pursuant to* § 202(a)(3)(A)(iii), must be technologically and economically achievable within the lead time available before implementation date of the standards.

Petitioner's first reading of the provisions is the correct one. Section 202(a)(1) and (2) do not require that the necessary control technology be available at the moment of promulgation of standards. Rather, standards are to "take effect after such period as the Administrator finds necessary to permit the *development and application* of the requisite technology." 42 U.S.C. (Supp. III) 7521(a)(2) (emphasis added). As discussed previously, the Administrator concluded that trap-oxidizer technology had already been developed, and that the tasks remaining before it could be applied were relatively straightforward.

Simply to characterize the 0.2 gpm standard as "technology-forcing," and conclude that it was therefore unauthorized, is misleading. The Administrator specifically addressed this point (Pet. App. 84a):

> The term "technology-forcing" often implies that the sought-after technology is completely unknown or unforeseeable, but such is not the case here. * * * [T]his rulemaking is technology-forcing only in the

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[7]GM first raised these arguments in its petition for rehearing and suggestion for rehearing en banc, filed May 6, 1981.

> respect that it will encourage a feasible control strategy that might otherwise be ignored.

In other words, the 0.2 gpm standard was meant to require that the remaining work necessary for application of the trap-oxidizer technology be pursued, which might not have occurred without the standard. The Administrator could impose this requirement under Section 202(a)(1) and (2) and believed that it was necessary and proper to protect the public health.

Petitioner also asserts (Pet. 12-13) that without the mandate of Section 202(a)(3)(A)(iii) the Administrator might have adopted a lesser standard or required it to go into effect at a later date. The record demonstrates, however, that the Administrator was quite lenient on both counts. Instead of requiring the new standard to take effect in 1984 as suggested by the manufacturers themselves, he granted the industry an additional year of lead time. In addition, instead of selecting a standard that would eliminate at least some diesel-powered cars, he adopted a standard to accommodate even the "dirtiest" engine. It is difficult to square these generous concessions to the industry with the assertion by petitioner that the Administrator felt compelled to require excessive requirements for particulate emissions.

2. Petitioner next argues (Pet. 23-27) that the court of appeals' review of the Administrator's projection of technological feasibility was insufficient to satisfy the "arbitrary and capricious" standard of judicial review. The fact is, however, that the court recognized its obligation to conduct a searching examination of the record, and appropriately inquired whether " 'the decision was based on a consideration of the relevant factors and whether there has been a clear error of judgment' " (Pet. App. 18a, quoting *Portland Cement Association* v. *Ruckelshaus*, 486 F. 2d 375, 402 (D.C. Cir. 1973), cert. denied, 417 U.S. 921 (1974)).

The court correctly saw its role as judging the "reasonableness" of the Administrator's projections (Pet. App. 19a-20a). Given that the Act "requires the EPA to look to the future in setting standards" (Pet. App. 20a), the court applied the following, appropriate criteria for evaluating the reasonableness of the Agency's projections (Pet. App. 26a):

> We think that the EPA will have demonstrated the reasonableness of its basis for prediction if it answers any theoretical objections to the trap-oxidizer method, identifies the major steps necessary in refinement of the device, and offers plausible reasons for believing that each of those steps can be completed in the time available. If the agency can make this showing, then we cannot say that its determination was the result of crystal ball inquiry, or that it neglected its duty of reasoned decisionmaking.[8]

The critical question was whether the Administrator had offered a "reasoned explanation of its basis for believing" that the requisite technology—the trap-oxidizer—could be developed and applied by the 1985 model year (Pet. App. 20a). Obviously, the reasonableness of the Agency's prediction must be viewed in light of the substantial time period between promulgation of the standard and its effective date. Although it introduced uncertainties, the substantial lead time also gave the Administrator "greater scope for confidence that theoretical solutions will be translated successfully into mechanical realizations," and allowed "greater

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[8]The court of appeals was unanimous with regard to the issue of the appropriate standard of review. The partial dissenting opinion had "no quarrel with this standard," and questioned only whether EPA had satisfied one of the stated criteria; *i.e.*, whether it had offered plausible reasons for believing that the remaining steps necessary for application of the technology could be completed in time (Pet. App. 56a).

leeway to modify its standards if the actual future course of technology diverges from expectation" (Pet. App. 21a-22a).[9]

Petitioner nevertheless argues that the court of appeals adopted an approach to reviewing agency action that is not searching enough. Petitioner would have the court of appeals view the reasonableness of the Administrator's actions under the test applied where standards are to take effect in the *near* term, *International Harvester Co.* v. *Ruckelshaus*, 478 F. 2d 615 (D.C. Cir. 1973), and "where the facts pertinent to [a] standard's feasibility are available and easily discoverable by conventional technical means." *National Lime Association* v. *EPA*, 627 F. 2d 416, 454 (D.C. Cir. 1980).

We submit the court of appeals properly distinguished these situations, recognizing that petitioner's approach would effectively limit the Agency to setting standards based on existing technology. The court's test was both pragmatic and consistent with the Administrator's task, for, if one were to "judge the EPA's action by the standard of certainty appropriate to current technology, the agency will be unable to set pollutant levels until the necessary technology is already available" (Pet. App. 19a).[10]

3. Finally, petitioner argues (Pet. 16-23) that the evidence in the record did not support the regulations adopted by the Administrator. This fact-bound issue was properly disposed of by the court of appeals. After a careful review of the administrative record, the court concluded that the Administrator had demonstrated the reasonableness of the

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[9]EPA has, in fact, initiated administrative proceedings which would lead to such modifications, if appropriate. See pages 15-16, *infra*.

[10]In other words, the industry could preclude EPA from setting a standard based on trap-oxidizer technology by the simple expedient of refusing to develop the technology.

projections that trap-oxidizers would be available for use in the 1985 model year (Pet. App. 37a; footnote omitted):

> [W]e find sufficient support for the EPA's necessarily predictive judgment and therefore uphold the EPA's particulate standard. The agency has given the manufacturers substantial lead time, and there is room for interim adjustments to the standard without significant hardship. Under those circumstances, the applicable standard of review allows the EPA considerable latitude to exercise its expertise through reasoned projections. We find that the agency has given an adequate explanation of its reasons for believing that the necessary steps in improving trap-oxidizer technology can be completed in the time remaining.

Petitioner attacks the court's well-reasoned decision on two points: First, it contends that no trap-oxidizer has yet been designed which is durable enough to withstand use for 50,000 miles.[11] Second, petitioner asserts that the Administrator allowed insufficient lead time for manufacturers to perfect technology and apply it to production vehicles. These two points are inseparably linked. As petitioner agrees, durable trap-oxidizers can be developed (Pet. App. 25a-26a & n.22, and accompanying text); the only question is when.[12]

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[11]Section 202(d)(1) of the Act, 42 U.S.C. (Supp. III) 7521(d)(1), specifies a useful life of five years or 50,000 miles for which light-duty vehicles must comply with emission standards (Pet. App. 65a).

[12]For this reason, petitioner's argument (Pet. 22) that it is being forced "to spend vast sums" on an "unreasonable" regulation is questionable. Since petitioner does not dispute the ultimate technological feasibility of the trap-oxidizer, but only the time necessary to apply the technology, any sums spent on research and development would not be wasted, even if EPA were to determine in further administrative proceedings that additional lead time should be provided.

The Administrator concluded that durable trap-oxidizers would be available for use on 1985 model-year cars, and the court of appeals held that that conclusion was reasonable based on the record before the Administrator at the time of the rulemaking. The court looked to encouraging test data and to the rapid progress manufacturers had made in a relatively short period of time in identifying suitable materials for use as trap filters[13] (Pet. App. 31a-34a). For example, the court noted that petitioner's own test data, in which a Buick Opel equipped with a metal mesh trap performed for more than 12,000 miles,[14] had been properly relied upon by the Administrator in making projections about the pace of technological development (Pet. App. 31a-32a). Moreover, the court found that the reasonableness of the Administrator's projections was confirmed by petitioner's own prediction, based on the status of its development program, that trap-oxidizer technology could be successfully applied in 1985 (Pet. App. 25a-26a & n.22, and accompanying text).

In light of these factors the court below properly concluded that the Administrator had demonstrated the reasonableness of his projections.

4. Petitioner's argument that trap-oxidizers will not be available by the 1985 model year relies heavily upon unsubstantiated statements concerning its progress in meeting the 0.2 gpm standard *since* the promulgation of the standard

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[13]During rulemaking, EPA pointed to a wide variety of possible materials that had yielded promising results, including a ceramic-coated metal mesh used by GM. Trap filters of alumina-coated metal mesh or alumina-coated steel wool had also yielded encouraging results. Regulatory Analysis 48, 49, 51 (J.A. 527, 528, 530).

[14]Petitioner misrepresents this test, claiming that "[t]he vehicle lasted only 12,800 miles before the trap material deteriorated and lost its effectiveness" (Pet. 17). However, the trap did *not* lose its effectiveness. The record shows that the "trap survived 12,800 miles and at that time had a collection efficiency *similar to its zero-mile efficiency of 55 percent*." Regulatory Analysis 51 (J.A. 530) (emphasis added).

(Pet. 4, 6, 7, 8, 9, 20, 21). The reviewing court's role, of course, is limited to review of the full administrative record before the agency at the time of its action. *Camp* v. *Pitts*, 411 U.S. 138, 143 (1973); *Citizens to Preserve Overton Park, Inc.* v. *Volpe*, 401 U.S. 402, 420 (1971).

If petitioner in fact has new evidence concerning its ability to meet the 0.2 gpm standard, that evidence can be addressed appropriately only by the Administrator in new administrative proceedings. As petitioner notes (Pet. 22-23), administrative proceedings already have been initiated to reexamine the feasibility of the 0.2 gpm standard in light of subsequent events. 46 Fed. Reg. 31677 (1981) (Pet. App. 142a-145a).[15] In short, consistent with the prediction of the court of appeals (Pet. App. 21a-22a) that the substantial lead time provided in the regulation would allow interim adjustments, if necessary, EPA already has set out to consider whether intervening events warrant modification of the 0.2 gpm standard. If those proceedings lead to relaxation or postponement of the 0.2 gpm standard, they would provide petitioner with all the relief it requires.

To be sure, petitioner complains that, in the meanwhile, it is required to "spend vast sums" in pursuit of the outstanding regulation. But even that questionable burden (see note 12, *supra*) may be removed. On September 30, 1981, petitioner filed with EPA a Petition to Suspend Application of

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[15]The study, part of the President's program to provide regulatory relief to the U.S. auto industry (Pet. App. 142a):

> will reexamine the technological feasibility of the final particulate standards for light-duty diesel vehicles [the 0.2 gpm standard] and light-duty diesel trucks by updating the earlier feasibility analysis with information on progress made by both vehicle manufacturers and independent suppliers in the development of trap-oxidizer technology. EPA expects to complete this review before the time when major capital investments would have to be made by the industry to comply with the standards.

the 1985 Diesel Particulate Standards, requesting an administrative stay of the obligation to attempt to comply with the 0.2 gpm standard pending EPA's proposed reconsideration of the particulate standards for light-duty diesel vehicles. Without remotely forecasting the Administrator's decision on the Petition to Suspend, we note that this application affords petitioner a further opportunity to put its case before the Agency, which, if successful, would relieve it of the burden complained of without undue delay. In the normal course, a ruling on the Petition to Suspend would be issued in a matter of weeks.

CONCLUSION

The petition for a writ of certiorari should be denied. Alternatively, the Court may deem it appropriate to withhold action pending an administrative decision on the pending Petition to Suspend.

Respectfully submitted.

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Petitioner's Reply Brief

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No. 81-201

IN THE

Supreme Court of the United States

OCTOBER TERM, 1981

GENERAL MOTORS CORPORATION, *Petitioner,*

v.

ANNE M. GORSUCH, ADMINISTRATOR, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, *Respondent.*

On Petition for a Writ of Certiorari to the United States Court of Appeals for the District of Columbia Circuit

REPLY BRIEF OF PETITIONER GENERAL MOTORS CORPORATION

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QUESTIONS PRESENTED

General Motors Corporation (GM) hereby adopts and incorporates by reference its statement of questions in its petition for certiorari at i.

PARTIES BELOW

Parties are identified in the GM petition for certiorari at i.

STATEMENT REGARDING CORPORATE PETITIONER PURSUANT TO SUPREME COURT RULE 28.1

The required statement appears in the GM petition at ii.

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LEGISLATIVE HISTORY:

H.R. REP. No. 564, 95th Cong., 1st Sess., 178 (1977), *reprinted in* [1977] U.S. CODE CONG. & AD. NEWS, 1502, 1509 8

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*Relevant statutes are reproduced in the Appendix [App.] at 63a-74a.

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OPINIONS AND ORDERS BELOW

Opinions and orders are described in full in the GM petition at 1.

JURISDICTION

The jurisdictional bases for review by this Court are set forth in the GM petition at 2.

STATUTES INVOLVED

The pertinent sections of the Clean Air Act are summarized in the GM petition at 2-3 and set forth in full in the Appendix at 63a-74a.

STATEMENT OF THE CASE

This reply brief corrects the material misstatements and addresses the arguments in the opposition briefs of respondents EPA and NRDC.

EPA now asserts for the first time that the particulate standards challenged by GM were not based "on the mandate of any particular section of the Clean Air Act." EPA Br. at 2-8. This assertion is incorrect and inconsistent with its previous position. EPA promulgated the standards pursuant to § 202(a)(3)(A)(iii). 45 Fed. Reg. 14496, App. 76a. During rulemaking and before the Court below EPA consistently maintained that § 202(a)(3)(A)(iii) "mandates the particulate regulations for motor vehicles." Regulatory Analysis at 30, 1, Supp. App. 62a, 60a. EPA blatantly acknowledged that it promulgated technology-forcing standards "to fulfill the 'greatest degree of emission reduction' mandate of [§ 202(a)(3)(A)(iii)]." Regulatory Analysis at 32, App. 154a.

EPA also now asserts that it promulgated the stringent standards because it was necessary to protect health and not because it was required to by § 202(a)(3)(A)(iii). EPA Br. at 7-8. This assertion is also inaccurate. Although EPA con-

sidered the possible health risk, it dismissed the health risk for lack of definite evidence. Supp. App. 41a-48a.[1] EPA promulgated the stringent 0.2 particulate standards because it believed that this standard would produce the greatest degree of emission reduction that § 202(a)(3)(A)(iii) ostensibly mandated. Regulatory Analysis at 1, Supp. App. 60a.

Petitioner GM argued in the Court of Appeals that § 202(a)(3)(A)(iii) did not authorize emission standards for light-duty vehicles. GM maintained, and the Court of Appeals agreed, that the section applies only to heavy-duty vehicles. NRDC alleges that GM first raised this argument in its reply brief and that the argument was therefore untimely made. NRDC Br. at 11 n.20. EPA asserts that "GM first raised these arguments in its petition for rehearing and suggestion for rehearing en banc. . . ." EPA Br. at 9 n.7. Both respondents are wrong. Actually, GM raised the argument in its petitioner's brief and its reply brief in the Court of Appeals. Supp. App. 38a-39a.

Finally, both EPA and NRDC misrepresent the status of technological development. EPA inaccurately asserts that "the Administrator concluded that trap-oxidizer technology had already been developed. . . ." EPA Br. at 9. Actually, the Administrator concluded that "trap-oxidizers are not now feasible for production application. Advances are still needed in the areas of collection efficiency, durability, and regeneration initiation and control." 45 Fed. Reg. at 14503, App. 100a.

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[1] NRDC misrepresents the possible health hazard of diesel particulates. NRDC Br. at 5-8. The Court of Appeals rejected these same assertions as having "no merit." Slip op. at 38-39, App. 38a-39a. A detailed response to NRDC is contained in the joint brief filed in the Court of Appeals by GM and other intervenors and is included in the supplemental appendix at 23a.

ARGUMENT

I. The Failure Of The Court Of Appeals To Correct The Agency's Admitted Mistake Of Law Was Erroneous And Prejudicial

EPA promulgated particulate emission standards under § 202(a)(3)(A)(iii) for diesel-powered light-duty vehicles. 45 Fed. Reg. at 14496, App. 76a. Section 202(a)(3)(A)(iii) mandates particulate emission standards that require "the greatest degree of emission reduction achievable. . . ." EPA established stringent standards "to fulfill the 'greatest degree of emission reduction' mandate of [§ 202(a)(3)(A)(iii)]." Regulatory Analysis at 32, App. 154a.

Petitioner GM argued in the Court of Appeals that § 202(a)(3)(A)(iii) did not authorize particulate standards for light-duty vehicles. GM asserted that § 202(a)(1),(2), not § 202(a)(3)(A)(iii), empowered EPA to prescribe standards for light-duty vehicles. Supp. App. 58a. GM argued that standards under § 202(a)(1),(2), however, must be technologically achievable and that the particulate standards were not technologically achievable.[2] *Id.* GM requested the Court to remand and direct EPA to promulgate reasonable standards pursuant to § 202(a)(1),(2). GM informed the Court that EPA "would not be required to prescribe the most stringent standards achievable [under § 202(a)(1)], for § 202(a)(1), unlike § 202(a)(3)(A)(iii), does not require that the standards 'reflect the greatest degree of emission reduction achievable.'" Supp. App. 58a.

Although the Court of Appeals correctly ruled that § 202(a)(3)(A)(iii) did not authorize emission standards for light-duty vehicles, the Court nevertheless upheld the standards under § 202(a)(1). Slip op. at 16, App. 16a. This decision

[2] Section 202(a)(2), which applies to all standards prescribed under § 202(a)(1), provides that a standard may not take effect until "after such period as the Administrator finds necessary to permit the development and application of the requisite technology."

affirmed unattainable technology-forcing standards that were promulgated to fulfill the mandate of an inapplicable statute. Regulatory Analysis at 32, App. 154a. The Court's decision was wrong.

The Court omitted mention of the "greatest reduction" mandate of § 202(a)(3)(A)(iii) and thereby misapprehended the fundamental differences between § 202(a)(3)(A)(iii) and § 202(a)(1),(2). The Court consequently failed to recognize the need to remand to EPA. The Court should have directed EPA to replace the unattainable technology-forcing standards with standards that do not require the "greatest reduction achievable" and that become effective only after the period that EPA finds is necessary to develop and apply the technology. The failure to remand contravened the rule that "[w]here an administrative agency has made an error of law the duty of the Court is to correct the error of law committed by that body, and after doing so to remand the case so as to afford it the opportunity of examining the evidence and finding the facts as required by law." *NLRB* v. *General Pipefitters Local No. 638*, 429 U.S. 507, 522 n.9 (1977).

The Court also violated the rule that "an administrative order cannot be upheld unless the grounds upon which the agency acted in exercising its powers were those upon which its action can be sustained." *SEC* v. *Chenery Corp.*, 318 U.S. 80, 95 (1943). EPA now argues that *Chenery* is limited to an adjudication of complex facts based on an improper legal standard and that this case is like *NLRB V. Wyman-Gordon Co.*, 394 U.S. 759 (1969), in which the Court did not order remand. This argument is spurious. Although the instant case involved rulemakming, it is like *Chenery* because the EPA applied an improper legal standard to complex facts. Moreover, it is unlike *Wyman-Gordon* because the error in *Wyman-Gordon* was insignificant. The administrative action "was not seriously contestable," and there was "not the slightest uncertainty as to the outcome" on remand. 394 U.S. at 766-67 n.6. Unlike *Wyman-Gordon*, a remand here would not be "idle and useless."

EPA and NRDC erroneously assert that a remand is unnecessary because there is "no significant difference" between § 202(a)(1),(2) and § 202(a)(3)(A)(iii). NRDC Br. at 12, EPA Br. at 8. Like the Court of Appeals, EPA avoids any mention that § 202(a)(3)(A)(iii) mandates the "greatest degree of emission reduction" and that EPA's emission standards "fulfill" this mandate. *Compare* Pet. at 12 *with* EPA Br. at 8. The inclusion of the "greatest reduction achievable" mandate only in § 202(a)(3)(A)(iii) demonstrates that the sections are not redundant. Congress required a high degree of emission reduction in § 202(a)(3)(A)(iii) but not in § 202(a)(1),(2). The standards that EPA promulgated under the mandate of § 202(a)(3)(A)(iii) and that the Court erroneously upheld under § 202(a)(1) consequently require a degree of reduction that Congress neither envisioned nor authorized.

EPA and NRDC, like the Court of Appeals, also misconceive GM's argument. EPA Br. at 9, NRDC Br. at 11. GM does not assert that the particulate standards are unauthorized under § 202(a)(1),(2) because they are "technology-forcing." GM argues that any standards set under § 202(a)(1),(2) must be achievable and that the specific particulate standards being challenged are not achievable within the prescribed time period. Pet. at 10, 16, 27. GM maintains that EPA established the unachievable standards because it promulgated them under the inapplicable mandate of § 202(a)(3)(A)(iii). These unachievable and unauthorized standards will prevent the manufacture of diesel-powered cars and light-trucks beginning in model year 1985.

II. The Agency's Prediction Of Achievability Was Rooted In Mere Theory And Lacked Evidentiary Support

While the technology involved in this case may be complex, the legal issue of the sufficiency of evidence is simple. EPA seeks to characterize as "reasoned decisionmaking" a prediction of achievability in millions of vehicles in actual use throughout their 50,000-mile statutory "useful lives" on the basis of a *single* low-mileage experimental car equipped with a

primitive trap which lasted only 12,800 miles. Judge Robb's succinct observation in dissent below that "[p]ious hope and speculation cannot take the place of evidence" provides perhaps the best insight available with respect to the state of the evidence upon which EPA relies.[3]

Specifically with respect to that evidence, respondents' contentions are quickly and easily rejected. A fair reading of EPA's discussion of the 12,800-mile experimental durability vehicle discloses that the trap on that vehicle did in fact deteriorate (by means of self-incineration) and lose efficiency (the trap was removing *less than* 55 percent of the particles from the exhaust and was losing its accumulated particulates). *Compare* Supp. App. 62a, *with* EPA Br. at 14 n.14, NRDC Br. at 8, text accompanying n.14. *This* is the record evidence upon which GM *relies*. *Cf.* EPA Br. at 14-15 (suggesting that GM's arguments depend on this Court's acceptance of "new evidence"). GM's proffer of proof regarding the current state of the art of trap-oxidizer technology in such manner deemed necessary and appropriate *by this Court* was made for the sole purpose of informing the Court that, despite the passage of

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[3] EPA appears to have abandoned its argument that "the resources allocated to the problem" will be determinative of trap-oxidizer development. EPA now argues that the economic waste attributable to its unreasonable standards is "questionable" because "any sums spent on research and development would not be wasted, even if EPA were to determine in further administrative proceedings that additional leadtime should be provided." EPA Br. at 13 n.15.

This argument assumes that the standard, which was wrongly promulgated under the "greatest reduction" mandate of § 202(a)(3)(A)(iii), would remain at 0.2. GM maintains that it would not. *See* Argument I, *supra*. A lesser standard would not necessarily require a trap-oxidizer. Thus, if EPA establishes a reasonable, less stringent standard under § 202(a)(1), (2) that does not require a trap-oxidizer, the sums spent on trap-oxidizer technology will be wasted.

time, the optimism of both EPA and the Court of Appeals had not borne fruit. Pet. at 8-9.[4]

GM thus adheres to the statement in its petition that the status of the record before this Court remains virtually unchanged. Further confirmation of this assertion appears in connection with the discussion contained in Argument IV, *infra*.

III. The Court Below Erroneously Diluted The Traditional Arbitrary And Capricious Standard Of Review Applicable To EPA Regulations

In *International Harvester* v. *Ruckelshaus*, 478 F.2d 615 (D.C. Cir. 1973), the Court of Appeals established that the Agency must adduce sufficient evidence to support a prediction of technological achievability. The Court recently reiterated that "[p]romulgation of standards based upon inadequate proof of achievability would defy the [Clean Air Act's] mandate against action that is 'arbitrary and capricious' . . . ." *National Lime Ass'n* v. *EPA*, 627 F.2d 416, 430 (D.C. Cir. 1980). In the instant case, the Court of Appeals abandoned its rigorous review and erroneously adopted a diluted standard, requiring only that an agency respond to "theoretical objec-

[4] NRDC claims low particulate levels for 1982 certification vehicles and remarkable strides in trap-oxidizer development. NRDC Br. at 9. Neither of these assertions is valid. NRDC neglects to mention that 1982 diesel vehicles are certified to a more relaxed standard for emissions of oxides of nitrogen (NOx) than that applicable to 1985 vehicles and the Court of Appeals' recognition that there is "an unfortunate trade-off between particulate control and control of [NOx]" (*i.e.*, as NOx is reduced, particulates increase), App. 7a. Any reading of the letter authored by counsel for Mercedes-Benz will illustrate NRDC's blatant misrepresentation of the significance of the "successful" Mercedes-Benz test result upon which it relies. *Compare* Supp. App. 53a-56a *with* NRDC Br. at 9, text accompanying n.16. GM's negative experience with particulate control equipment supplied by Johnson-Matthey, also relied on by NRDC (*id.*, text accompanying n.17) is detailed in its response for the record of the Senate proceedings cited by NRDC. Supp. App. 49a.

tions," identify "major steps" and offer "plausible reasons" in support of its hope that theory can become reality on some arbitrary schedule. This diluted "standard" was inconsistent with the mandate of Congress. *See* H.R. REP. NO. 564, 95th Cong., 1st Sess., 178 (1977), reprinted in [1977] U.S. CODE CONG. & AD. NEWS 1502, 1509; Pet. at 25.

Respondents argue that the principles of *International Harvester* are limited to cases "where standards are to take effect in the near term." EPA Br. at 12. Respondents further assert that those principles are inapplicable because EPA's predictions "necessarily involve a large element of policy judgments . . . ." NRDC Br. at 13. These assertions are spurious. *International Harvester* and subsequent decisions applying its principles demonstrate that the Agency must support its prediction of achievability regardless of the amount of lead time. *See* Pet. at 22, n.20. Moreover, the determination of technological achievability is patently a factual question, not a "policy judgment," and *International Harvester* perforce applies. *See Lead Industries Ass'n* v. *EPA*, 647 F.2d 1130, 1146 (D.C. Cir. 1980) (factual and policy determinations are "conceptually distinct types of decisions" that call for different modes of judicial review.) NRDC's assertions notwithstanding, this is not a case like *FCC* v. *National Citizens Committee for Broadcasting*, 436 U.S. 775, 814 (1978), where factual support in the record for the agency's judgmental prediction "is not possible or required . . . ."

IV. Absent Review Of This Case By This Court, The Prospects For Timely And Meaningful Relief Are Negligible

Before the Court of Appeals and before this Court, GM has sought to effectuate its right to meaningful judicial review in an effort to have this matter remanded to the Agency with the kind of guidance that only the courts can provide. The Court of Appeals abdicated its duty to provide that guidance by failing to correct EPA's error of law, by venturing far beyond the proper bounds of deference to administrative discretion and

by eviscerating the traditional "arbitrary and capricious" standard of review. Instead, the Court of Appeals repeatedly invoked the "safety valve" of possible subsequent relaxation of the standards by the Agency. Slip op. at 22, 34, 37. App. 22a, 34a, 37a. The Court's reliance on this mechanism and EPA's attempt to capitalize on the reliance neither comport with any acceptable concept of meaningful judicial review nor present a realistic alternative for manufacturers under the circumstances of this case. Surely this approach ignores the *International Harvester* Court's admonition that grave economic consequences flow from such a result.

Cognizant of the weakness of their arguments on the legal and factual issues raised by GM, and perhaps as a reaction to the slim margin by which rehearing en banc was denied below,[5] both respondents would prefer to have EPA proceed with some as yet undefined second look at the standards unhindered by this Court's definitive construction of the applicable statutory authority and proper application of the standard of review governing agency rulemaking.

Accordingly, EPA encouraged GM to file with the Agency a petition for suspension of the 1985 standards. *See* Supp. App. 1a. Counsel for EPA represented to GM that this petition will receive serious consideration. In the meantime, absent relief from this Court, GM and other manufactuers will continue to suffer the waste of resources devoted to compliance with unreasonable standards.[6]

GM noted the urgency of its situation in filing its petition for certiorari approximately one month earlier than required

[5] The suggestion of en banc rehearing was denied 5-4 with Chief Judge Robinson and Judges Wright, Mikva, Ginsburg and Edwards in the majority and Judges Robb, Tamm, Wilkey and MacKinnon voting to grant the suggestion. App. 61a-62a.

[6] As regards the lead time issue, GM rests on the arguments presented in its petition for certiorari (Pet. at 18-23), as augmented by the more recent information presented in its petition for suspension. Supp. App. 1a.

by rule. GM's June 1981 deadline for tooling orders already has expired. Its willingness to pursue further avenues of administrative relief should not be construed as affecting its position before this Court that law, fact and policy support the need for review of the Court of Appeals' decision.

CONCLUSION

The technologically unachievable 1985 particulate standards promulgated by EPA will prevent the manufacture of diesel-powered cars and light-duty trucks. EPA promulgated these unachievable standards to fulfill the mandate of an inapplicable statute. The Court of Appeals, which recognized EPA's mistake of law, erroneously upheld the standards. The Court's failure to remand breached the fundamental duty of the Court to correct the Agency's error and remand the case so that the Agency will act according to the law. GM respectfully requests this Court to grant GM's petition for certiorari and remedy the breach of duty by the Court of Appeals.

Respectfully submitted,

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October 23, 1981

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GENERAL MOTORS CORPORATION

F. JAMES McDONALD
PRESIDENT

September 30, 1981

The Honorable Anne M. Gorsuch
Administrator
U.S. Environmental Protection Agency
401 M Street S.W.
Washington, D.C. 20460

Re: Alternative Relief Pending Supreme Court Review of 1985 Light-Duty Diesel Particulate Standards

Dear Ms. Gorsuch:

Enclosed for your urgent consideration is General Motors "Petition to Suspend Application of 1985 Diesel Particulate Standards" applicable to light-duty vehicles and light-duty trucks, prepared by our Office of the General Counsel.

As you may be aware, a GM request for judicial review of these standards is pending as of this date before the Supreme Court of the United States. The Agency's recently announced intention to restudy the feasibility of these standards, however, has persuaded GM to make this concurrent attempt to seek administrative resolution of the issues raised in that litigation. During a recent conference EPA counsel encouraged this approach.

There is continued waste of scarce resources associated with our ongoing efforts to comply with 1985 diesel particulate standards that were not technologically feasible when promulgated and are demonstrably unachievable today. In recognition of the inherent fuel-efficiency advantage provided by diesel engines, GM has publicly announced its plans to continue serving a diverse variety of customer needs by expanding the availability of diesel-powered light-duty vehicles to 20 percent of its new vehicle fleet in 1985. Those plans, and the potential energy savings they represent, are in substantial jeopardy as long as the excessively stringent 1985 standards remain in effect.

Therefore, GM submits the enclosed petition in the hope that this matter might yet be resolved promptly through administrative action and respectfully urges you to grant such petition at the earliest possible date.

The petition for suspension provides a brief overview of GM's diligent efforts to develop technology for the purpose of controlling diesel particulate emissions as well as its pursuit of every available administrative and judicial remedy with respect to the technologically infeasible 1985 standards. GM encourages the Agency to recognize that these standards virtually assure the demise of fuel-efficient diesel engines in light-duty vehicles in model year 1985. Such a result, with its attendant adverse consequences for economic recovery and energy conservation, is unjustifiable whether on the basis of law, fact, public health or public policy.

In conclusion, GM urges the Agency to grant the enclosed petition as promptly as possible. As a second step, GM urges you to revise the numerical level and effective date of the 1985 standards by completing the study that you have announced and by instituting a rulemaking proceeding for further comment by all interested parties.

GM submits the enclosed petition for suspension for the purpose of seeking prompt resolution of this pending controversy between GM and the Agency. Given the substantial amount of expenditures toward development of trap-oxidizer technology, GM would be seriously prejudiced if required to await the completion of the announced study and any subsequent rulemaking to revise the 1985 standards before it learns whether the standards and their effective date will be relaxed. Thus, immediate suspension will prevent further waste of resources while the Agency's study proceeds.

We eagerly await notification of your disposition of the enclosed petition for suspension.

Very truly yours,

/s/ F. JAMES MCDONALD
F. James McDonald

Enclosure

cc: Ms. Kathleen Bennett,
EPA Assistant Administrator
for Air, Noise and Radiation
Mr. Gerald Gleason
Attorney, EPA Office
of the General Counsel
Mr. Sam Gutter
Attorney, EPA Office
of the General Counsel
Mr. Louis Claiborne
Deputy Solicitor General

PETITION TO SUSPEND APPLICATION OF 1985 DIESEL PARTICULATE STANDARDS

General Motors Corporation (GM) hereby petitions the Administrator of the Environmental Protection Agency (EPA) for suspension of the application of its "Standard for Emission of Particulate Regulation for Light-Duty Vehicles and Light-Duty Trucks," 45 Fed. Reg. 14496 (1980), insofar as that regulation establishes a 1985 standard of 0.20 grams per mile (g/mi.) for diesel passenger cars and 0.26 g/mi. for light-duty trucks, pending completion of the study of the standards announced by EPA June 17, 1981 (46 Fed. Reg. 31677-78).

The standards are not technologically feasible for the 1985 model year and are the subject of a petition for writ of certiorari filed by GM with the Supreme Court of the United States on July 31, 1981. Unless suspension is granted, or the Supreme Court grants the pending petition and invalidates the standards, GM will be unable to produce light-duty diesel vehicles for the 1985 model year. In view of EPA's announced intention to study the standards, GM submits that a suspension of the standards pending completion of that study would be more appropriate than having the Supreme Court review at this time standards subject to change by EPA in the future.

BACKGROUND

On March 5, 1980, EPA promulgated the subject regulation, which established particulate emission standards first becoming effective in model year 1982 at a level of 0.60 g/mi. The regulations also provide for a 200 percent increase in stringency to a level of 0.20 g/mi. beginning in model year 1985 (0.26 g/mi. for light-duty trucks).

Following publication of the final rule, GM sought and was denied reconsideration of the 1985 standards. 45 Fed. Reg. 48133 (1980). GM then filed in the United States Court of Appeals for the District of Columbia Circuit a petition for judicial review of the standards. This case was consolidated with

several other challenges of the diesel particulate standards and EPA NOx waiver decisions. The 1985 particulate standards were affirmed by a 2-1 vote. *Natural Resources Defense Council, Inc.* v. *Costle*, No. 80-1312 (consolidated with Nos. 80-1464, 80-1710, 80-1712 (April 22, 1981) [hereinafter cited as Slip Op.].

In response to the Court of Appeals decision, GM filed a combined Petition for Rehearing and Suggestion for Rehearing En Banc. By orders dated May 27, 1981, rehearing was denied (again 2-1) and rehearing en banc was denied by a sharply divided Court, 5-4 (with two judges not participating).

On July 31, 1981, approximately one month prior to the applicable filing deadline, GM filed in the Supreme Court of the United States a petition for a writ of certiorari, seeking final review of the 1985 particulate standards. *General Motors Corporation* v. *Gorsuch*, No. 81-201. This case is pending in the Supreme Court as of the date of this petition for suspension.

Noting EPA's announcement that it intends to study the validity of the 1985 standards (46 Fed. Reg. 31677, 31678 (1981)), GM submits this petition for suspension pending completion of that study as an alternative means of resolving the controversy surrounding the 1985 standards. Immediate favorable action on this petition for suspension is urgently requested. The problem presented by the 1985 standards is one that can and should be resolved administratively by EPA. The lack of sufficient lead time in which to solve the monumental technological difficulties presented by the 1985 standards makes it imperative that the standards be addressed now either by EPA or the Supreme Court. Immediate suspension pending completion of the study announced by the Agency will enable EPA and the industry to work toward resolution of this matter without Supreme Court intervention.

REASONS FOR GRANTING THE PETITION FOR SUSPENSION

Throughout the course of the proceedings outlined above, GM has maintained consistently that EPA erroneously relied on the wrong source of statutory authority in promulgating

the 1985 standards and based the level and timing of those standards on an overly optimistic and unreasonable prediction of technological feasibility lacking sufficient evidentiary support in the rulemaking record.[1] In addition, since 1974 (six years prior to the publication of the final rule and three years prior to the enactment of the statutory authority upon which EPA erroneously relied), GM has expended vast amounts of financial and human resources in a concentrated effort to resolve the complex technological difficulties associated with control of diesel particulate emissions. Accordingly, GM submits that suspension is justified on the basis of the following points and authorities.

1. Recent Developments Demonstrate That GM Cannot Meet The 1985 Standards Because The Lead Time Provided By The Standards Has Not Been Sufficient To Develop The Technology Necessary For Compliance With The Standards

Although compliance with the 1985 standards theoretically would be permitted by means of any appropriate technology, it is beyond serious dispute that EPA set those standards premised on its belief that "trap-oxidizers" would be available for use on 1985 model year production vehicles. There is agreement also that trap-oxidizer durability is the most critical issue bearing upon achievability of the 1985 standards. Moreover, the "best" (*i.e.*, least negative) evidence of trap-oxidizer durability also is uncontroverted: a single small low-mileage GM vehicle operated on an unrealistically light driving schedule that did not include hard accelerations, hills or speeds in excess of 45 miles per hour for only 12,800 miles before the simple metal mesh trap installed on the vehicle deteriorated and lost effectiveness.

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[1] Since the Court of Appeals' decision (*i.e.*, in its petition for rehearing and suggestion for rehearing en banc, as well as in its pending petition for certiorari), GM also has contended that the Court of Appeals erroneously diluted the "arbitrary and capricious" standard of judicial review applicable to EPA's action in promulgating the 1985 standards.

A single experimental vehicle, lasting for less than one-third of its 50,000-mile statutory useful life (not to mention the 100,000 miles postulated by EPA) with a primitive trap under very light driving conditions is hardly "evidence that [EPA's prediction] will correspond to reality" as required by the leading case of *International Harvester Co.* v. *Ruckelshaus*, 478 F.2d 615, 644 (D.C. Cir. 1973). The "reasoned decision-making" required by the *International Harvester* case has been supplanted here by a "crystal-ball projection." Under these circumstances, and on the basis of the rulemaking record existing as of this time, GM submits that suspension is warranted for the purpose of enabling EPA to reevaluate the *evidence* under the appropriate statutory criteria of §§ 202(a)(1) and (2).

Further, the lack of subsequent developments in this area since the rulemaking record was closed confirms the invalidity of EPA's original speculative projection. A discussion of lead time considerations will demonstrate, despite continuing diligent effort and massive expenditures of resources, that the passage of time has not produced the necessary answers, thereby virtually assuring the demise of fuel-efficient light-duty diesel vehicles beyond model year 1984.

In the very near future, GM will submit its detailed response to EPA's announcement of its study of the 1985 standards (46 Fed. Reg. 31677, 31678 (1981). The contents of that response, summarized here, illustrate that while much has been learned, GM's longstanding major program for the development of diesel particulate emission controls remains in most respects in the research phase.

The research phase, of course, is only the first in an arduous series of time-consuming steps that must be completed prior to the mass-production of a viable commercial product for public use under the full range of real-world driving conditions. Normal start of production for the 1985 model year would be July of 1984. Because of the inherent complexity of trap-oxidizer technology, good engineering practice dictates that actual field experience be gathered by producing a limited

volume of such vehicles well in advance of across-the-board application to 1985 diesel vehicles. Production of these "early" vehicles should be commenced no later than six months before normal start of production. Prior to production of these vehicles, EPA certification procedures can consume 18 months. Accordingly, GM must begin certifying vehicles equipped with trap-oxidizers in mid-1982.

Between the date of this petition and that date, GM must complete the further extensive research that is required, including the fundamental step of identifying a suitable trapping material. Beyond that, GM must successfully incorporate the device that emerges from that research (if any) in a vehicle application for rigorous testing under real-world conditions and, perhaps by arrangements with an outside supplier, design, manufacture and install tooling based on exacting specifications allowing narrow tolerances for error in order to produce and incorporate the technology in production vehicles.

Obviously, such tooling cannot be ordered until an acceptable final design is identified. Based on normal timing and good engineering practice, as applied to a complex new technology, GM should have ordered such tooling in June, 1981. No acceptable final design has yet been identified and GM remains in the research phase. Time spent in this phase obviously compresses the time available for completion of the sequence of other essential steps in the lead time process. Thus, for all practical purposes, time has run out, as is more fully illustrated below.

After testing a large number of trapping materials,[2] GM currently is focusing on a ceramic wall-flow monolith material. Durability problems, however, continue to plague the devel-

[2] E.g., EPA based its feasibility prediction on a metal mesh trap lasting only 12,800 miles. Although GM has not totally abandoned its work on the metal mesh material, the susceptibility of this material to catastrophic destruction by fire (see attached Appendix at A-1) and other durability problems has led to the realization that it is not likely to be the most promising material.

opment effort with cracking and melting of the material occurring at very low mileages. The photographs appearing at pages A-2, A-3 and A-4 of the Appendix to this Petition illustrate failures typical of this material. (Ceramic foams also have been tried, with similar results (see Appendix at A-5).) The new "best" durability that can be reported by GM, utilizing the ceramic monolith material, is only *1,860 miles* in a vehicle application. In fact, on a recent test trip, five vehicles equipped with trap-oxidizers utilizing the monolith material were driven from the Detroit area to Denver, Colorado, for test and evaluation. None survived the entire trip, and no fewer than 18 monoliths failed during the course of the trip.

Regeneration initiation and control by various means has disclosed a fuel economy penalty under virtually every method investigated, and some methods, involving sophisticated microcomputer technology, add excessive cost and complexity. The required frequency of regenerative events (*e.g.*, every 40-100 miles) also constitutes a problem in terms of durability, fuel economy and potential safety considerations inherent in the extremely high temperatures reached during regeneration. Thus, several fundamental questions remain unresolved.

These factors confirm that GM remains in the very early stages of the lead time process at a time when it should be entering the latter stages of that process. From the standpoint of complying with the 1985 standards, its continuing efforts become increasingly futile. Yet, so long as these standards remain in effect, GM must continue to absorb the premium costs and increased risks of ultimate failure associated with the excessive stringency and unrealistic deadline of the 1985 standards. There is no substitute for the practical testing experience of manufacturers who confront a technology that refuses to be "forced" to the level and at the pace derived from EPA's crystal ball. The time for acknowledgement of conditions existing in the real-world and for responsiveness to those conditions in the form of suspension and revision of the ill-conceived 1985 standards is upon us.

II. Suspension And Revision Would Alleviate Unnecessary Cost And Energy Burdens

Each passing day brings further waste of valuable resources in a time of unparalleled economic hardship for GM and the industry as a whole as manufacturers strive to simultaneously accommodate resolution of basic research questions with the realities of production lead time as measured against an unnecessary and unreasonable numerical standard and an artificial deadline, both of which are unsupported in law or in fact. These are precisely the kind of "grave economic consequences" that the *International Harvester* court endeavored to prevent in the context of EPA's erroneous denial of manufacturer applications for suspension of 1975 model year gaseous emission standards. The court expressly recognized that reliance on subsequent relaxation as justification for an initially unreasonable standard gave rise to such consequences.

The waste inherent in these unnecessary investments and development costs is further compounded when other economic factors and the potential impact of the 1985 standards on national energy conservation goals are considered. These considerations emerge from the widely recognized threshold premise that diesel engines offer a 25 percent or greater fuel efficiency advantage in light-duty vehicles over their gasoline counterparts. In the worst case, the 1985 standards will completely eradicate that benefit by effectively precluding the production of these vehicles.

Even without trap-oxidizers, diesel engines cost several hundred dollars more than comparable gasoline engines. Yet, customers who prefer diesels are willing to exchange that premium for the economic advantage provided by the engine's excellent fuel efficiency. That willingness, though, diminishes as the cost premium increases. The additional substantial cost of trap-oxidizers, combined with the inherent fuel economy *penalty* attributable to their operation, sharply mitigates the incentive to purchase diesel vehicles. Loss of diesel sales, and a corresponding loss in nationwide fuel savings therefore will be

lost, with no commensurate benefit derived. The directional impact of this result on the national economy is predictably negative and should be avoided by suspension and revision.

III. Suspension Of The Standards Pending Completion Of This Study Will Give The EPA The Opportunity To Promulgate New Standards Under The Proper Section Of The Clean Air Act

Both the excessive stringency of the numerical standards and the unjustified urgency of the 1985 effective date are directly traceable to EPA's firmly held mistaken conviction that it was obligated to fulfill the explicit statutory mandate of § 202(a)(3)(A)(iii) by promulgating standards requiring the "greatest degree of emission reduction achievable" and taking effect "as expeditiously as practicable." Placing specific reliance on these statutory criteria, EPA expressly characterized the 1985 standards as "technology-forcing" 45 Fed. Reg. at 14498, and resolved significant technological uncertainties in favor of "encouraging" manufacturers to allocate "sufficient resources" to the problem of complying with the standards.

The Court of Appeals, adopting the analysis of law and legislative history provided by GM, correctly held that EPA's statutory interpretation was wrong. The Court concluded that § 202(a)(3)(A)(iii) was intended by Congress to apply exclusively to *heavy-duty* vehicles and not to the light-duty vehicles that were the subject of the rulemaking. *See* Slip Op. at 10-17. The Court determined that EPA authority to regulate light-duty diesel particulate emissions did exist under the general standard-setting provisions of §§ 202(a)(1) and (2). The Court offered no explanation for its apparent conclusion that EPA's erroneous reliance on § 202(a)(3)(A)(iii) did not necessitate a remand.

Had EPA embarked from the proper statutory criteria of §§ 202(a)(1) and (2), EPA could not reasonably have set the technologically infeasible 1985 standards. These provisions, unlike § 202(a)(3)(A)(iii), do not specifically mandate "expe-

ditious" applicability of particulate standards reflecting the "greatest reduction achievable." Rather, they provide general authority to establish standards with the proviso that such standards are to become effective only "after" a period of time found by EPA to be "necessary" to "permit" the "development and application" of the requisite technology § 202(a)(2). EPA resolutely ignored these criteria, and, conceding the uncertainties in its feasibility projection for the 1985 standards, unequivocally identified its error, asserting:

> Nevertheless, *to fulfill the greatest degree of emission reduction mandate of the Clean Air Act*, EPA has concluded that it is absolutely necessary to issue standards which motivate the private sector to maximize its efforts in reducing particulate emissions from *light-duty vehicles*.

"Regulatory Analysis of the Light-Duty Diesel Particulate Regulations for 1982 and Later Model Year Light-Duty Diesel Vehicles." (February 20, 1980), 32 [emphasis supplied]. EPA thus explained the stringency and timing of its 1985 standards. The Court of Appeals' holding that § 202(a)(3)(A)(iii) applies only to heavy-duty vehicles quickly and decisively dismantles the legal basis for these "technology-forcing" standards. As a matter of statutory law, there *is no* "greatest reduction" mandate applicable to *light-duty* vehicles; thus, there *is no* "absolute necessity" for light-duty particulate standards and, accordingly, no need to "maximize" efforts to control these emissions.

On the basis of the foregoing, it is respectfully requested that EPA grant this petition for suspension of the legally invalid 1985 standards and proceed to cure these legal defects by promulgating revised standards.

IV. Conclusion

The current Administration, including EPA in particular, has repeatedly emphasized its commitment to the reduction of unwarranted economic burdens flowing from unnecessary and unreasonable regulations. This petition provides a classic example of that kind of regulation and a clear opportunity to

fulfill that commitment by swift and sure action to immediately suspend and promptly revise the 1985 diesel particulate standards applicable to light-duty vehicles.

The grounds upon which this petition may be granted are clearcut and straightforward:

1. As the Court of Appeals held, the standards were promulgated under the wrong source of statutory authority. *Natural Resources Defense Council, Inc.* v. *Costle, supra.*

2. The evidence upon which the standards were based is insufficient to support EPA's feasibility prediction, particularly under the *proper* source of statutory authority.

3. The substantial negative impact on the industry, the economy as a whole and on national energy conservation goals is without justification.

On the basis of law, fact, public health and public policy, GM urgently requests that this petition be granted at the earliest possible date, and that such action be followed by resolute action to revise the level and timing of the 1985 diesel particulate standards.

OTIS M. SMITH
Otis M. Smith
General Counsel

/s/ WILLIAM L. WEBER
William L. Weber
Attorney-in-Charge
Federal Motor Vehicle
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/s/ THOMAS L. ARNETT
Thomas L. Arnett
Attorney

September 30, 1981

APPENDIX

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A-1	Metal Mesh	12,800 miles
A-2	Ceramic Wall-Flow Monolith	1,860 miles
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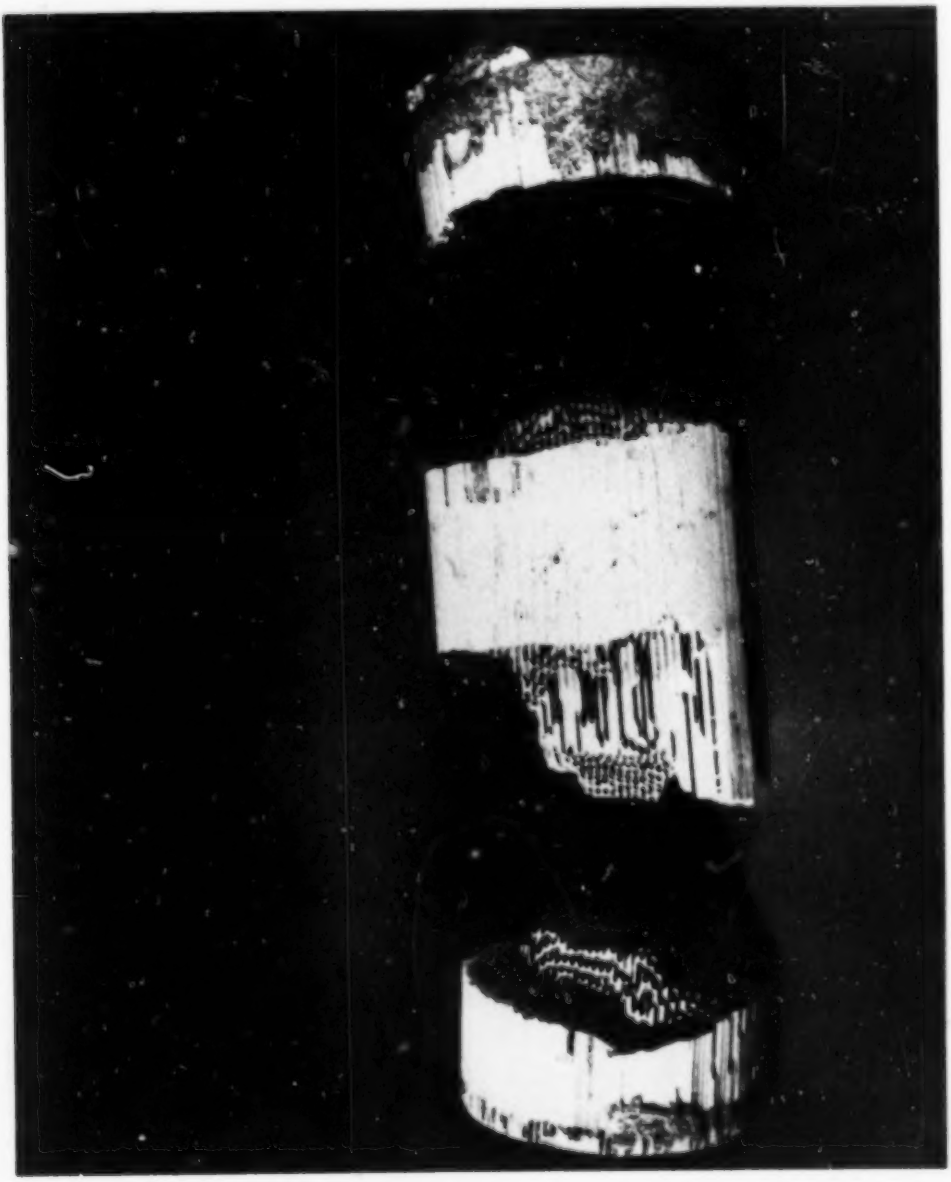
A-4	Ceramic Wall-Flow Monolith	
A-5	Ceramic Foam	None Reported*

* Figure A-5 depicts failure after simulated mileage on engine dynamometer. This material has not been developed sufficiently to warrant vehicle application.

A-1

A-2



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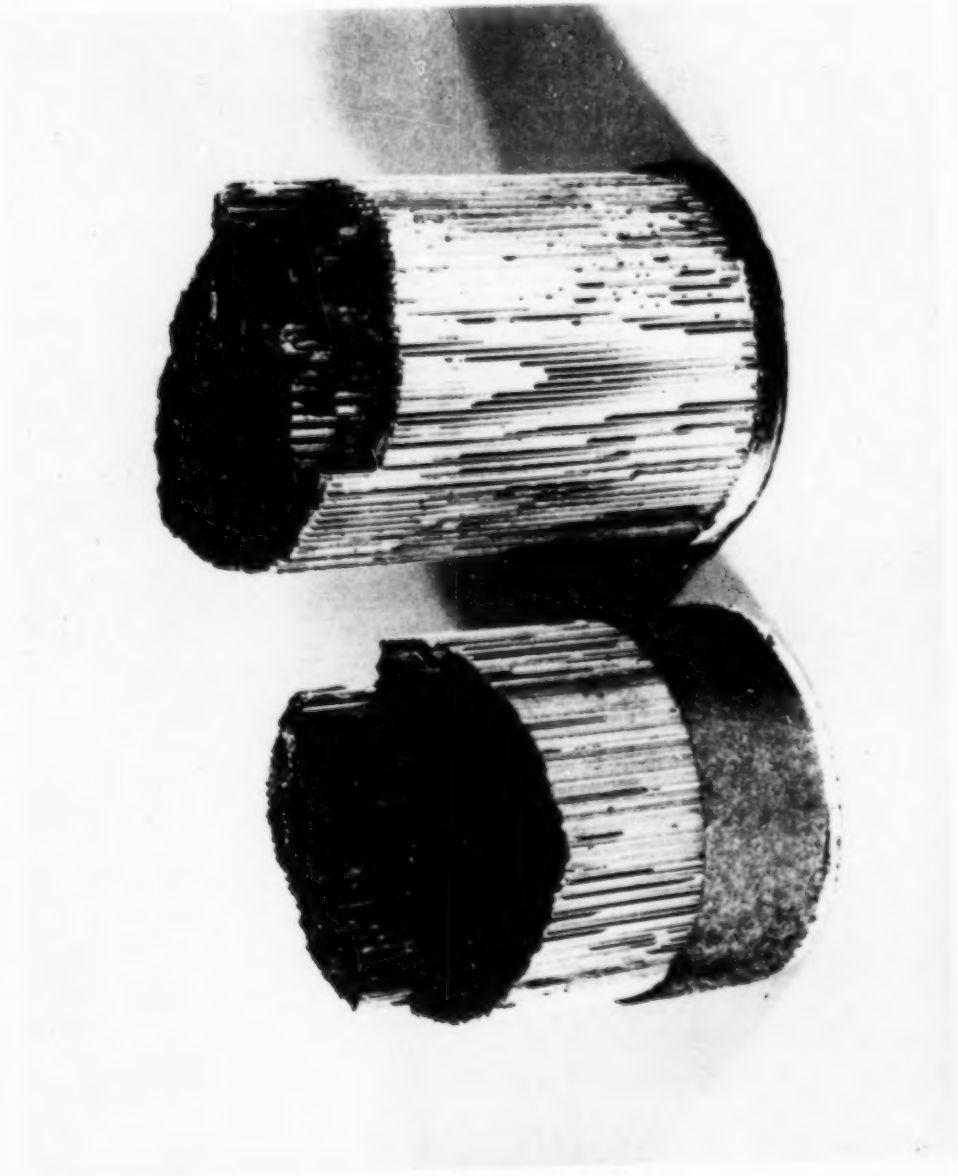

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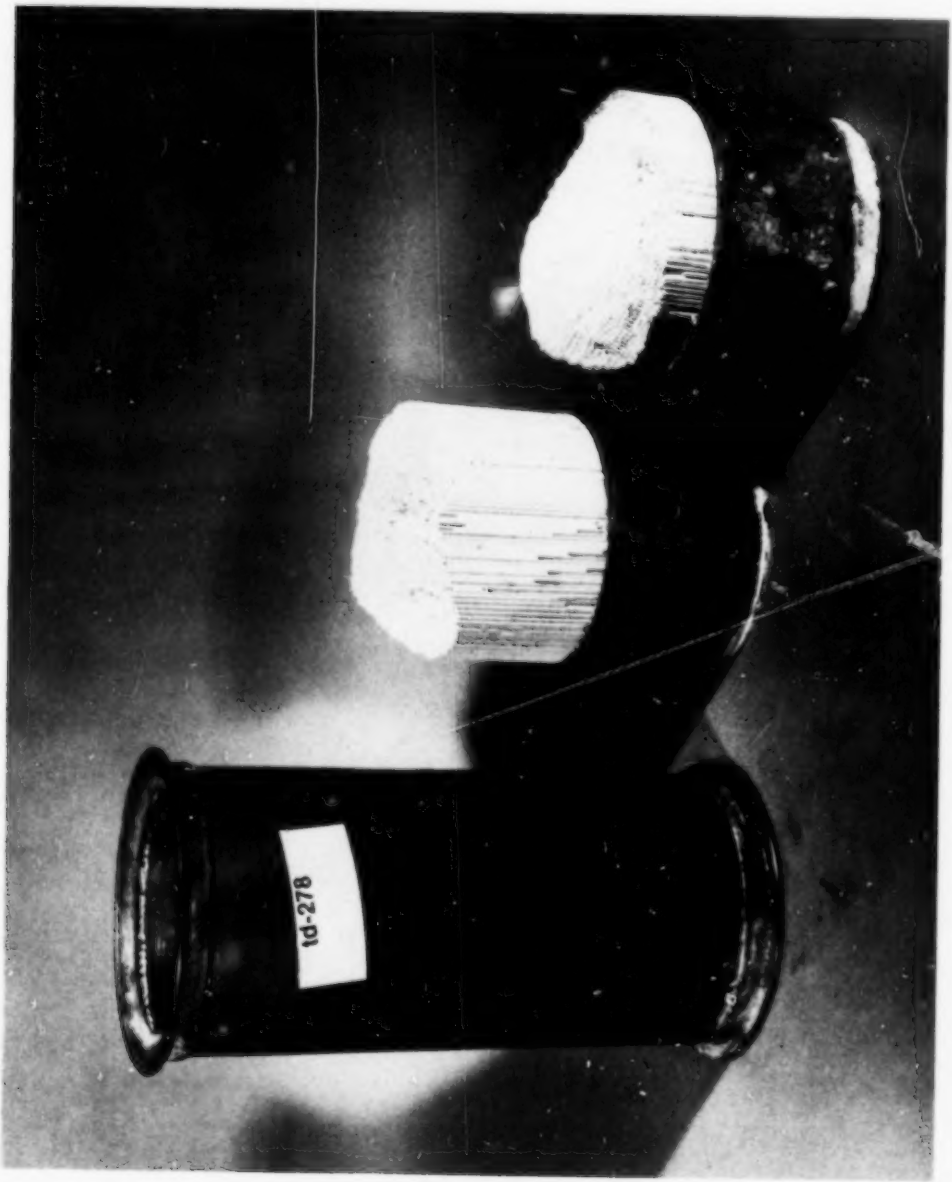
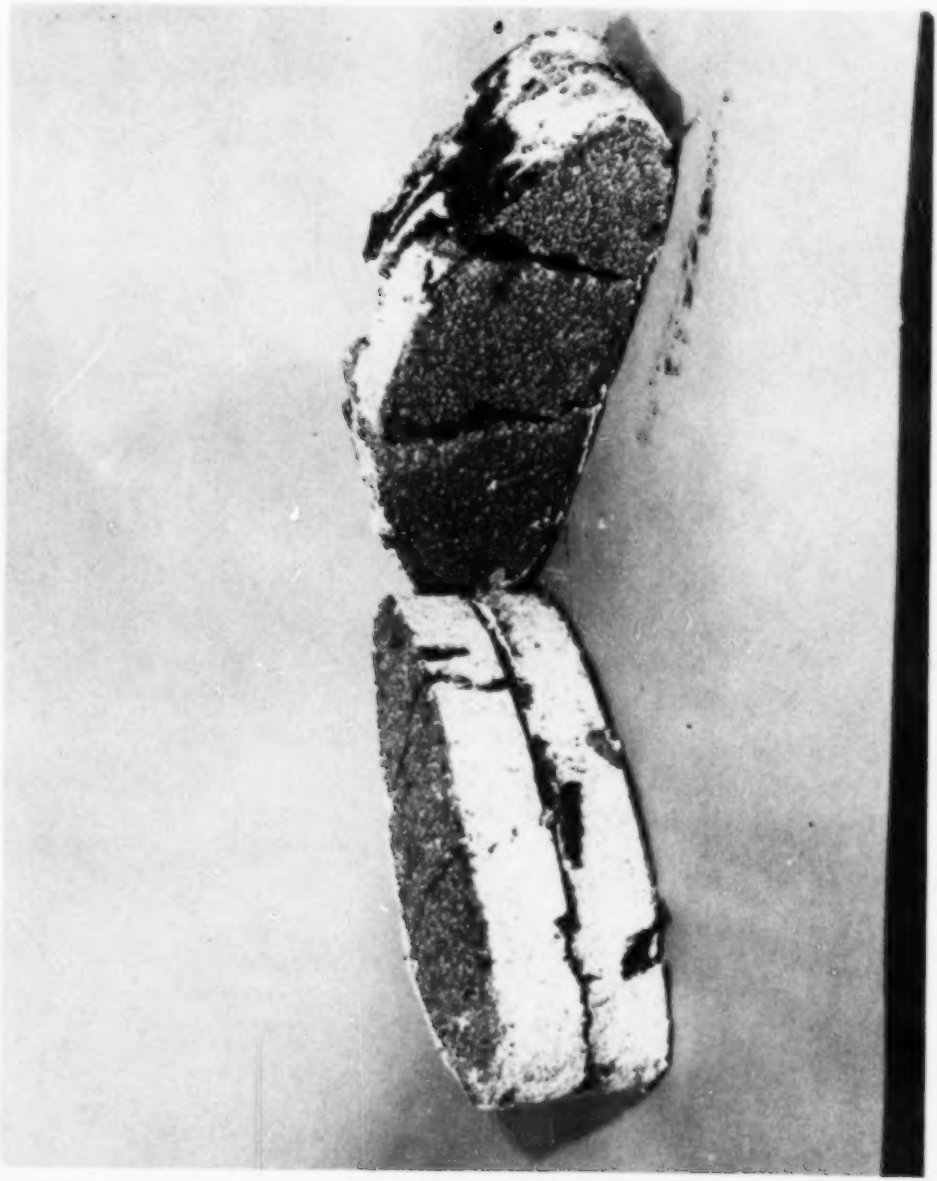


20a

A-5



GENERAL MOTORS CORPORATION

October 9, 1981

The Honorable Anne M. Gorsuch
Administrator
U.S. Environmental Protection Agency
401 M Street S.W.
Washington, D.C. 20460

Re: Supplemental Information Regarding General Motors "Petition to Suspend Application of 1985 Diesel Particulate Standards"

Dear Ms. Gorsuch:

This will supplement General Motors "Petition to Suspend Application of 1985 Diesel Particulate Standards," which was filed with the Agency on September 30, 1981. This supplemental letter is being submitted to clarify certain information presented in the Table of Contents shown on the cover page of the "Appendix."

Your attention is invited to the column labeled "Best Durability Reported in Vehicle Application," on the cover page of the above-mentioned "Appendix," which indicates that metal mesh particulate trapping material had achieved a durability level of 12,800 miles. This is the Opel durability vehicle that was tested in September, 1977. EPA relied heavily on this test in predicting that the 1985 particulate standards were feasible. To date, this remains the "best" durability reported to EPA by GM for simple metal mesh material.

However, in the preparation of General Motors submission in connection with EPA's study of the standards announced in 46 Fed. Reg. 31677, 31678 (1981), it has come to our attention that GM soon will be reporting to the Agency a new maximum durability for a catalyzed metal mesh material of 34,100 miles. In order to avoid being misled into thinking that substantial progress has been made with respect to the durability of metal mesh traps, it is important to realize that an analysis of the details of the "34,100-mile test" yields a result not sig-

nificantly different from that observed in the "12,800-mile test." Most importantly, particulate saturation of the material and blowoff of trapped particulates caused the metal mesh to become so clogged (zero collection efficiency) that, at the 19,000-mile mark of the "34,100-mile test," the trap had to be *physically removed* from the vehicle and "regenerated" by placing it *in an oven*. Thereafter the trap was reinstalled and further mileage accumulated. Although deterioration and blowoff were observed both before and after this point, the reinstalled material experienced gross disintegration at 34,100 miles, resulting in termination of the test. Because the trap had to be removed and regenerated in an oven during the course of the test, GM does not believe that the test result is representative of any improvement in metal mesh durability. Thus GM has concentrated its focus on other materials.

For these reasons, GM brings this new information to the Agency's attention not only to supplement its petition to suspend, but to confirm its statement in footnote 2 at page 5 of that petition that further investigation of metal mesh materials continues despite the consistent lack of promise exhibited by these materials.

Very truly yours,

OTIS M. SMITH
Otis M. Smith
General Counsel

cd

cc: Ms. Kathleen Bennett,
EPA Assistant Administrator
for Air, Noise and Radiation
Mr. Gerald Gleason
Attorney, EPA Office
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Mr. Sam Gutter
Attorney, EPA Office
of the General Counsel
Mr. Louis Claiborne
Deputy Solicitor General

/s/ WILLIAM L. WEBER, JR.
William L. Weber, Jr.
Attorney in Charge
Federal Motor Vehicle
Regulations

IN THE

United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA CIRCUIT

Nos. 80-1312 and 80-1712
(Consolidated with Nos. 80-1464 and 80-1710)

NATURAL RESOURCES DEFENSE COUNCIL, INC.,
Petitioner

v.

DOUGLAS M. COSTLE, ADMINISTRATOR,
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY,
Respondent

On Petition For Review of Final Actions of the United States Environmental Protection Agency

JOINT BRIEF OF INTERVENORS GENERAL MOTORS CORPORATION, MERCEDES-BENZ OF NORTH AMERICA, INC., VOLKSWAGEN OF AMERICA, INC., AND AUTOMOBILES PEUGEOT

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body of scientific and medical knowledge regarding the possible health effects of diesel particulate emissions. NRDC apparently seeks to obscure this issue with conclusory allegations and alarmist rhetoric. Careful review of all of the evidence presented to the Administrator confirms that the possibility of harmful effects attributable to diesel exhaust emissions is not nearly as substantial nor as imminent as NRDC would have this Court believe.

A. Current Evidence Is Insufficient to Support a Finding of an Increased Risk of Cancer Attributable to Diesel Particulates.

NRDC's ultimate conclusions are that diesel particulate emissions either definitely cause cancer (*see* NRDC Brief at 55) or at least "pose a serious and substantial risk" of estimated "hundreds of cancer deaths." (NRDC Brief at 42-43.) Neither of these conclusions, nor the premises upon which they are based, is supported by the record.

1. There Is No Adequate Scientific Proof That Diesel Particulates Present a Cancer Risk.

Because direct evidence of the effect of diesel particulates on human health is difficult to obtain (*accord*, NRDC Brief at 15), researchers have concentrated on a number of different studies having varying degrees of probative value. Broadly characterized, these studies may be viewed as comprising a hierarchy including, in descending order of probative value, epidemiologic studies,[9] animal inhalation studies,[10] animal skin-painting studies,[11] and mutagenicity studies.[12] The following summary of the evidence in the record pertaining to each of these types of studies establishes that there are substantial uncertainties that remain to be resolved in all of these areas.

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[9] The study of the effects of exposure to a given stimulus among a defined human population group. Addendum A.

[10] *In vivo* (in the living organism) investigations of the effect on lower order animals of exposure to large doses of diesel exhaust. Addendum A.

[11] In these studies, the material under study is solubilized and painted on the skin surface of test animals at regular intervals to determine if tumors will develop. Addendum A.

[12] Mutagenicity is the process of inducing a permanent genetic change in a cell or organism. These studies are conducted *in vitro* (in a test tube or similar non-living environment). Addendum A.

a.) Epidemiologic studies

Because epidemiologic studies focus on actual long-term human exposure to diesel exhaust, they are highly probative of the ability of a given population to tolerate such exposure.[13] NRDC admits that "[s]tudies of several occupational groups exposed to diesel exhaust have failed as yet to show an effect," but indicates that these studies have been criticized. NRDC Brief at 15. According to EPA:

> Current evidence of the risk of human cancer from diesel particulate emissions, based on epidemiological studies conducted on populations exposed to high levels of diesel particulates, is *contradictory at best*. 45 Fed. Reg. at 5490, (N-96) JA 852 (col. 3) (emphasis supplied).

Notwithstanding NRDC's summary listing of criticisms of epidemiologic studies, an overview of these studies confirms that several groups of persons subjected to significant exposure to diesel particulates have tolerated the exposure with no measurable increase in the incidence of lung cancer within those groups.

The most important of these studies to date focused upon London transport workers, who were exposed to diesel exhaust from buses used in the London Transport System. The study, conducted by the Medical Research Council in Great Britain from 1950 to 1954, disclosed no significant difference in the incidence of lung cancer among the transport workers as compared to the general population. This study subsequently was extended to include workers exposed to diesel exhaust up to the year 1974 with the same conclusion. R. Waller, "Trends to Lung Cancer Incidence in London in Relation to Diesel Fume Exposure," International Symposium on the Health Effects of Diesel Engine Emissions, Cincinnati, Ohio, December 3-5, 1979 (N-95) SJA 16-17. Thus, after 25 years of exposure, representing more than 420,000 man-years of diesel exhaust inhalation, the rate of workers between the ages of 45 and 64 who died, retired because of ill health, or were transferred to other work because of lung cancer did not differ sig-

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[13] *See* 44 Fed. Reg. 39,858, 39,871 (N-77); *Ethyl Corp.* v. *EPA*, 176 U.S. App. D.C. 373, 398, 541 F.2d 1, 26 (*en banc*), *cert. denied* 426 U.S. 941 (1976).

nificantly from the number of lung cancer cases among the population of greater London in the same age group.

Other studies, focusing upon railroad workers exposed to diesel locomotive exhaust, tend to corroborate the findings of the London transport worker study.[14] A number of studies of mine workers exposed to high concentrations of diesel exhaust in confined underground areas have resulted in similar negative findings (*i.e.*, no adverse health effects).[15]

Although epidemiologic studies have not demonstrated conclusively that diesel particulates cause no adverse health effects, such effects have not been observed in the most reliable studies to date.[16]

b.) Animal inhalation studies

According to EPA, "[b]ased on the limited number of animal studies which have thus far been conducted, there are *no data* which suggest an increased carcinogenic threat from the substitution of diesel for gasoline exhaust." EPA Literature Review at 6 (N-75), JA 1102 (emphasis supplied).

NRDC, however, insists that "[d]irect evidence of carcinogenesis in animals is building" (NRDC Brief at 14) and that "particulates have induced cancer in mice exposed for seven

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[14] GM Application at III-31-32 (N-7) JA 921-22. EPA Report "Health Effects Associated With Diesel Exhaust Emissions" (1978) (N-82) at 134-37 JA 1137-40.

[15] Although a study of the inhabitants of a Swiss mountain town demonstrated a higher incidence of cancer among residents who lived near highways, there were several flaws in the study that significantly mitigate its probative value as evidence of adverse health effects of diesel particulates. Briefly summarized, the major deficiencies in the study were as follows: 1) the proportion of diesel vehicles that were operated near the town, if any, was not determined; 2) ambient air levels of emissions were not measured; 3) asphalt particles, road oil, tire particles and small amounts of heavy metals or asbestos could have influenced the measurements therein; 4) the site of the study was chosen specifically because of the frequent weather inversions in that locale, thereby causing artificially high measurements; and, 5) no corrections were made for the possible effect of tobacco smoking among the subjects of the study.

[16] NRDC claims that "Even fine particles that are biologically inert themselves *can* enhance the toxicity of other inhaled pollutants." NRDC Brief at 10 (emphasis supplied). No such enhancement has been revealed in epidemiologic studies. Moreover, any enhancement at work has not been overlooked in past tests which have analyzed all the agents present in whole exhaust whether they were there *ab initio* or as the product of enhancement.

months." *Id.* at 15. Analysis of the details of the study (*id.* n. 28) upon which NRDC bases this conclusion reveals that these results are of doubtful probative significance in terms of the health risk to humans.

The results of the study relied upon by NRDC are subject to the following significant qualifications upon their applicability to humans: 1) the strain of mice used in the study is predisposed to develop lung tumors spontaneously even in the absence of any stimulus that is applied to induce tumor formation; [17] 2) only those animals that were "promoted" (injected with the known carcinogen urethane) before exposure to diesel exhaust exhibited any adverse health effect; [18] 3) *animals exposed only to whole diesel exhaust or to diesel particulates, and not injected with urethane, exhibited no adverse health effects;* [19] and, 4) animals were subjected to doses of particulates much higher than the levels to be found in the ambient atmosphere. Thus NRDC's assertion based upon this study that "[*d*]*iesel particulates* have induced cancer in mice exposed for seven months" (NRDC Brief at 15) (emphasis supplied) is either totally inaccurate (because a number of other factors, operating independently or in combination, could have caused or influenced the positive findings) or, at best, misleading in the extreme (because animals exposed *only* to particulates *did not* develop cancer).

c.) Animal skin-painting studies

NRDC, absent any qualifying language, contends that "[d]iesel particulate causes cancer when painted on the skin of mice." NRDC Brief at 14-15. There are at least two flaws in this unqualified assertion.

First, these skin-painting studies involve the use of an *extract* from the diesel particulate rather than the *whole* particulate. *See* 45 Fed. Reg. at 5490, (N-96) JA 852 (col. 2). Extracts typically contain very high concentrations of the most

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[17] *See, e.g.*, M. Shimpkin and G. Stoner, "Advances in Cancer Research," Vol. 21 at 46, 47 (1975).

[18] Orthoefer, *et al.*, "Carcinogenicity of Diesel Exhaust as Tested in Strain 'A' Mice," (N-93) SJA 1.

[19] *Id.*

toxic substances found on particulates and therefore yield results that do not accurately represent the effects of particulate inhalation.[20] Thus, the results of painting a diesel particulate extract on the skin of mice are entitled to little weight in concluding that diesel particulates pose an increased risk of lung cancer in humans.[21]

Second, NRDC's reference to pages 122-23 of the EPA Literature Review (N-75) JA 1125-26 (NRDC Brief at 15 n. 27) does not support its unqualified statement that skin-painting tests have conclusively demonstrated the carcinogenicity of diesel particulates. The emissions may not have been representative of typical diesel exhaust because the extracts came "from a grossly inefficiently operating diesel engine." EPA Literature Review at 122 (N-75) JA 1125. This document also noted that the solvent employed could affect the results. *Id.* at 123, JA 1126.[22]

d.) Mutagenicity studies

Mutagenicity studies, consisting of "short-term tests" (*see* text accompanying n. 25, *infra*, for a description of short-term test methodology), provide evidence having even less probative weight than skin-painting studies. According to the Interagency Regulatory Liaison Group, consisting of representatives of EPA and other federal agencies, "[s]hort-term tests for chemical carcinogens presently do not, in the absence of animal bioassays and epidemiologic data, constitute definitive evidence that a substance does (or does not) pose a carcinogenic hazard to humans." 44 Fed. Reg. at 39,870. The National Cancer Advisory Board Subcommittee on Environmental Carcinogenesis concurs that "[a]t present, none of the short term

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[20] As is more fully explained, *infra* (n. 25 and accompanying text), extracts are obtained by "washing" whole particulates in a solution consisting of a powerful industrial degreasing solvent in order to separate adsorbed chemicals from the particulate core. Biologic fluids found in the bodies of humans or animals are exceedingly less efficient in this regard. *See* Addendum F.

[21] Recognizing the inherent limitations of this type of study, EPA expressed the view that the results of skin-painting studies "are only suggestive evidence" that diesel particulates might contribute to some increased risk of cancer in humans.

[22] Intervenors are unable to comment upon the validity of the other authority cited by NRDC in this regard because this document does not appear in the rulemaking docket and remains to be obtained by other means.

tests can be used to establish whether a compound will or will not be carcinogenic in humans or experimental animals." *Id.* EPA concluded that the results of this type of testing also are "only suggestive" of a possible increased risk of cancer in humans attributable to diesel particulates. 45 Fed. Reg. at 5490, JA 852 (col. 2).

Undaunted by these limitations upon the probative significance of the results of mutagenicity studies, NRDC contends that "hundreds" of chemicals adsorbed on diesel particulates "have been shown to cause mutations in a broad array of tests that indicate a high probability" (NRDC Brief at 13) or even a "high likelihood" (*id.* at 42) of carcinogenicity, and that "these tests are increasingly accepted as indicators of carcinogenicity." NRDC Brief at 13-14 n. 25.[23] These conclusions cannot withstand analysis of the inherent limitations of mutagenicity studies.

As an initial matter, the identity of the chemicals is largely unknown. *See generally*, EPA Literature Review at 86 (N-75) JA 115. Current laboratory techniques measure only benzo(a) pyrene and use it as a shorthand indicator of the other chemicals present. But there is very poor laboratory-to-laboratory correlation on these methods. EPA Report, "Light-Duty Diesel Vehicle Particulate Emissions," (1977) 31 (P-2) SJA 19 (hereinafter Light-Duty Report). Even the technique itself is "highly questionable." EPA Literature Review at 44 (N-75) JA 1111.[24]

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[23] In a vain attempt to legitimize this conclusory assertion, NRDC relies in part upon papers prepared by the GM Research Laboratories that were appended to the GM NOx waiver application. NRDC Brief at 13-14 n. 25. A fair reading of these papers discloses that the authors recognize the utility of mutagenicity studies as a screening device for potential carcinogens but do not support the NRDC position that such studies conclusively demonstrate a likelihood that diesel particulates cause cancer.

[24] Further, "[t]he diesel engine is by no means the only (or even major) source of the pollutants of primary concern." EPA Literature Review at 1 (N-75) JA 1100. The quantity of possibly carcinogenic polycyclics present on the particles cannot be determined because "the sampling and collection techniques are in a rudimentary stage of development." Light-Duty Report at 5 (P-2) SJA 18. In addition, "examination [is] complicated by the fact that particles and their agglomerates may be altered during the collection process prior to analysis." EPA Literature Review at 105-06 (N-75) JA 1123-24. The chemical agents may also evaporate before they reach humans. Light-Duty Report at 7 (P-2) JA 608.

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However, at least 42 organic chemicals have been identified in diesel exhaust. EPA Literature Review at 37-38 (N-75) JA 1104-05. But these chemicals together may not exert any of the effects that they do singly because of synergistic (intensifying) and antagonistic (canceling) effects. *See generally*, EPA Literature Review at 85-86 (N-75) JA 1114-15. The EPA Health Effects Research Laboratory stated the problem thusly:

> Caution must be exercised before implicating polar neutral compounds in diesel particulate fractions as major health hazards to man. The human body, when confronted with airborne particulate pollutants, has no physiologic means to chemically fractionate these complex organic mixtures. Target organs are thus simultaneously exposed to large numbers of environmental chemicals. It is well-established that various chemical components of polluted air, automobile exhaust, and tobacco smoke may interact with each other to either increase *or decrease* the carcinogenic response [citing studies]. Therefore, the biological activity of chemical mixtures cannot be reliably predicted based on the specific actions of individual components. EPA Literature Review at 98-102 (N-75) JA 1117-21 (emphasis supplied).

Studies that have resulted in the identification of bacterial mutagens among the compounds found adsorbed on diesel particulates must be qualified in terms of the inherent limitations of the methodology employed. In general terms, it must be understood that

> "factors governing ease of absorption [the degree to which potentially harmful chemicals are separated from the particulate such that they may interect with cells in the human body] and biotransformation [reaction initiated by a biologic system that alters the chemical nature of a substance] are important determinants of carcinogenic potency. These factors cannot be accounted for in bacterial systems. The apparent lack of correlation between potency in the Ames assay [a mutagenicity study method designed to identify mutations in Salmonella bacteria] under certain conditions with carcinogenic potency in animals further emphasizes the need for restraint in extrapolation of results." EPA Literature Review at 102 (N-75) JA 1121.

A likely explanation for the "apparent lack of correlation" between bacterial mutations and carcinogenicity in animals or

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humans relates to the manner in which studies resulting in findings of positive mutagenicity are conducted.

In order to determine the effect on bacteria of chemicals that may be adsorbed on diesel particulates, these chemicals must be separated from the particulate by some process which thus yields a diesel particulate "extract." This process of extracting the chemicals that are bound to the particulate typically has involved the use of the powerful industrial degreasing solvent dichloromethane (DCM). Addendum A. That this solvent is far more effective in extracting potentially harmful chemicals from particulates than the fluids actually contained in the bodies of either animals or humans is illustrated graphically by the table appended hereto as Addendum F.[25] Simply stated, "washing" particulates for hours by shaking them in a solution consisting of a powerful industrial solvent results in substantial levels of chemicals in the extract that do not exist when the particulates are placed in animal or human biologic fluid. Thus, studies based upon the use of DCM yield artificially high levels of mutagenicity. See Addendum F.

Apart from the fact that biologic fluids have been shown to be inefficient in separating the potentially harmful chemicals from diesel particulates, it is not at all clear that these chemi-

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[25] NRDC claims that "[r]*eadily soluble* particles or compounds on particle surfaces *can* rapidly *enter* the sensitive alveolar tissue or pass into the blood stream to reach other organs (emphasis supplied)." NRDC Brief at 10. This statement refers only to "readily soluble" particles and compounds. But diesel particulates are not readily soluble in body fluid. Regulatory Analysis at 68 (P-212) JA 547. Further, they can be cleared from the lungs. EPA Literature Review at 106 (N-75) JA 1124. NRDC cites no source which confirms that particles or compounds can or do "enter" alveolar tissue. NRDC therefore apparently means "be deposited on" rather than "enter." As indicated at subsection 2 of this Argument, *infra*, deposition is most often followed by removal.

Further, to say a chemical is 'soluble" is not to say that it enters the body's organs or the bloodstream. A chemical can be "soluble" in the sense that it is absorbed by the human system and yet not be assimilable or biologically available in any injurious sense. Therefore, "ease of absorption *and biotransformation* are important determinants of carcinogenic potency." EPA Literature Review at 102 (N-75) JA 1121 (emphasis supplied).

Thus, chemicals carried on a diesel particle, whether soluble or not, whether bioavailable or not, and whether adhering to the particle or not, are largely removed by natural cleansing mechanisms. *See* EPA Literature Review at 106 (N-75) JA 1124.

cals would be permitted to interact inside the human body even if body fluids could accomplish such separation. Clearance mechanisms within the body can operate to remove or perhaps neutralize particulates before these chemicals could be released, as is more fully explained in the following subsection of this Argument.

2. *Anticipated Small Doses and Bodily Defense Mechanisms Operate to Mitigate the Potential Risk of Cancer.*

NRDC repeatedly emphasizes the purported significance of the fact that diesel particulates are small enough to be inhaled into the deepest regions of the lung. *See, e.g.*, NRDC Brief at 10-11, 42-43. Thus, it is contended that particulates are "especially dangerous," (*id.* at 10) that they supposedly can "evade the lungs' defense systems for clearing foreign matter" (*id.*), that approximately "20-50 percent" of inhaled particulates "lodges" in the alveolar region of the lung (*id.*) and that "[r]eadily soluble particles or compounds can rapidly enter the sensitive alveolar tissue or pass into the blood stream to reach other organs." *Id. But cf.*, subsection 1(d) of this Argument, *supra* (indicating that mutagenicity studies utilizing biologic fluids have produced negligible positive results).[26] Even assuming that particulates can be inhaled deep into the lungs, this qualitative determination of respirability must be balanced with the quantitative *amount* that may be inhaled and the ability of the body to deal with that projected amount.

Although estimates of the amount of particulate material that will be suspended in the ambient air vary, several studies demonstrate that the estimated dose of particulates inhaled

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[26] Particulates do not "lodge" permanently in the alveoli. In fact, the alveoli clear fine particles, although their half-time clearance may be five to nine weeks. Regulatory Analysis at 67 (P-212) JA 547. Even while the particulates remain in the alveoli, they are not "lodged." Rather, they become enveloped or encysted in "macrophages" (*see* n. 28, *infra*, and accompanying text), that are later swept out of the body by natural cleansing systems. EPA Literature Review at 105 (N-75) JA 1123. Thus, NRDC's further contention that "[l]ess soluble materials *can* remain in *intimate contact* with the alveolar tissue for months *or even years*" also is inaccurate. NRDC Brief at 10 (emphasis supplied). In fact, the NRDC Report in which the quoted language appears continues: "[t]hey *are removed* relatively slowly either by transfer to the lymph system or by action of macrophages." NRDC Comments, App. B at 54 (N-59) (emphasis supplied).

by the typical person is extremely low. R. Williams and D. Chock, "Characterization of Diesel Particulate Exposure," International Symposium on the Health Effect of Diesel Engine Emissions, Cincinnati, Ohio (December 3-5, 1979) JA 755. By comparison, hundreds of experimental test animals have received particulate doses ranging from 1,000 to 6,400 times as high as those expected to be deposited in the lungs of humans, with no apparent adverse effect.[27] The tests cited by NRDC (NRDC Brief at 11-12) involved concentrations of 10,000 micrograms of particulates. This level is fully 133 times higher than the 75 microgram per cubic meter limit established by the National Ambient Air Quality Standard for Total Suspended Particulates.

Despite these massive doses, natural biologic defense mechanisms have been identified that accomplish the clearance of particulate materials from the lung. These include macrophages, or scavenger cells[28] which ingest particulates, polymorphonuclear leukocytes[29] having a similar function, the mucociliary transport system,[30] which provides a route of egress from the lung for macrophages that have ingested particulates, and the lymphatic system,[31] providing a route of clearance from the lung. Vostal, *et al.*, *supra*, n. 27.

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[27] J. Vostal, *et al.*, "Lymphatic Transport of Inhaled Diesel Particles in the Lungs of Guinea Pigs Exposed to Diluted Diesel Exhaust," International Symposium on the Health Effects of Diesel Engine Emissions, Cincinnati, Ohio (December 3-5, 1979). SJA 2. *See* Addenda D and E.

[28] NRDC recognizes that some particulates "are removed from the lower lung by macrophages, *a type of white blood cell*, which engulf the particles and transport them to the lymph system." NRDC Brief at 11 (emphasis supplied). Contrary to this NRDC assertion, macrophages are not white blood cells but rather tissue cells. Macrophages move particulates away from the lung. There is no evidence that particulates or macrophages containing particulates are transported to distant organs through the blood stream. *See* Addendum A; n. 21, 22 and accompanying text.

[29] A type of white blood cell which is capable of engulfing foreign material. Addendum A.

[30] A complex system of removal of foreign material from the deep region of the lung that depends on the action of the beating of fine hairlike extensions (cilia) in a fine mucous layer. The action of the cilia propels materials that are trapped in the mucous up and out of the lung. Addendum A.

[31] A specialized vascular system of the body which performs a variety of functions, among them being clearance of foreign material from organs to lymph nodes. Addendum A.

Thus, in stark contrast to NRDC's unsupported implication that the body is defenseless against a veritable onslaught of "dangerous" particulates, there is evidence, albeit not conclusive, that the amounts inhaled should be very low and once particulates are inhaled, bodily defense mechanisms can operate to mitigate the potential for any harmful effects.

3. *There Is No Basis for Any Quantitative Risk Assessment.*

NRDC cites the EPA Carcinogen Assessment Group [CAG] "Initial Review of the Potential Carcinogenic Impact of Diesel Exhaust" (June 11, 1979) (N-61) JA 1158 [hereinafter CAG Review] estimate that "there could be approximately 625 additional cases of cancer per year." NRDC Brief at 16.[32] "Even under the 1985 0.2 [gpm] standard," NRDC continues, "there could be approximately 125 extra cases." *Id.* Explaining its acknowledgement that these quantitative estimates are "very uncertain," NRDC argues that they "could *understate* the true risks by as much as 10-100 times[,]" (NRDC Brief at 17) (emphasis supplied) and seeks to support this latter statement by reference to a December 3, 1979, letter from Dr. Henry Rowen, Chairman of the National Academy of Sciences [NAS] Diesel Impacts Study Committee [DISC] to Mr. David Hawkins, EPA Assistant Administrator for Air, Noise and Radiation, JA 744 [hereinafter DISC Letter].[33]

The DISC Letter provides no direct support for NRDC's contention that the "true risks" could have been understated "by as much as 10-100 times." More importantly, the DISC Letter presents an objective and accurate assessment of the CAG estimates not even hinted at by NRDC's treatment of the document. That assessment thoroughly refutes the conclusion urged by NRDC. Noting that both the CAG Chairman and the CAG biostatistician had acknowledged the "inade-

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[32] This represents the estimated number of additional cancer *cases* per year *if* diesels attain 25 percent of the new car market by 1990 and *if* these vehicles had *no emission controls*. Because the 25 percent market penetration estimate subsequently was reduced to 17.5 percent, (Summary and Analysis at 9 (P-213) JA 327), the CAG Review cancer estimates might have been too high.

[33] For the convenience of the Court, a copy of this letter and the accompanying cover letter dated December 6, 1979 has been appended hereto as Addendum C. This cover letter explains that the critique of the CAG Reveiw by DISC was made pursuant to a contract between EPA and NAS.

quacy of the current state of scientific knowledge" and the resultant necessity for the use of "assumptions in lieu of reliable data, which, in the case of diesels, happen to be nonexistent[.]" Dr. Rowen concluded that it is "clear that the CAG had been directed to conduct the [CAG Review] despite the lack of adequate information. . . ." DISC Letter at 2, JA 745. In fact, "the very first sentence" of the CAG Review consisted of an admission that "the knowledge base . . . is insufficient to make an accurate estimate of the cancer hazard in the United States from [diesel engine exhaust]."[34] *See* DISC Letter at 2, JA 745. After criticizing the CAG methodology and assumptions (DISC Letter at 3-5, JA 746-47), Dr. Rowen concluded that the CAG Review "should have been deferred until it could be based on the findings of presently ongoing research[.]" DISC Letter at 6, JA 748. Further, almost as if he were anticipating misinterpretation or overstatement of the significance of the CAG estimates, Dr. Rowen cautioned EPA and others:

> The committee clearly recognizes the importance of valid quantitative risk assessments . . . and efforts should continue to assemble a reliable scientific data base and to develop suitable statistical methodology. Notwithstanding, *any estimates of specific numbers of deaths from cancer caused by diesel-powered light-duty vehicles*, even when expressed in terms of hypothetical worst-cases, *may give rise to misleading conclusions and, worse, inappropriate decisions, especially if the formulations are separated from the qualifying language. Id.* (emphasis supplied).

Expressing no definitive opinion regarding whether future investigations would or would not reveal any harmful health effects attributable to diesel exhaust emissions, Dr. Rowen concluded that "the scientific evidence to support numerical risk estimates of cancer deaths is lacking at this time." *Id.*

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[34] In fact, EPA itself decided in October, 1979 that the population exposure assumptions underlying the June, 1979 cancer risk estimates were invalid. EPA said in connection with the roadside impact of particulates:

> Questionable assumptions and extrapolations contained in the population exposure analysis were found and some would require considerable effort to improve or defend. As this analysis is not crucial to the environmental analysis, *it seems best to delete the population exposure analysis* at this time and leave it to be improved and defended at a later date when its need is more pressing. Summary and Analysis at iii (P-213) JA 310 (emphasis added).

IN THE

United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 80-1464

GENERAL MOTORS CORPORATION, Petitioner,
MERCEDES-BENZ OF NORTH AMERICA, INC.,
et al., Intervenors,
v.
DOUGLAS M. COSTLE, Administrator,
Environmental Protection Agency, Respondent.

No. 80-1312

NATURAL RESOURCES DEFENSE COUNCIL, INC.,
Petitioner,
v.
DOUGLAS M. COSTLE, Administrator,
Environmental Protection Agency, Respondent,
GENERAL MOTORS CORPORATION, *et al.*, Intervenors.

No. 80-1710

MERCEDES-BENZ OF NORTH AMERICA, INC., Petitioner,
v.
DOUGLAS M. COSTLE, Administrator,
Environmental Protection Agency, Respondent.

No. 80-1712

NATURAL RESOURCES DEFENSE COUNCIL, INC.,
Petitioner,
v.
DOUGLAS M. COSTLE, Administrator,
Environmental Protection Agency, Respondent.

On Petition for Review of Final Action of the Administrator, Environmental Protection Agency

BRIEF OF PETITIONER GENERAL MOTORS CORPORATION

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mesh element in the trap-oxidizer before the element began to disintegrate. Substantial testing of a wide assortment of other types of materials as possible elements in the trap-oxidizer did not produce any element that would survive in the vehicle for any significant mileage accumulation before incineration or destruction.

Therefore, speculating that technology somehow will become available, EPA promulgated standards applicable to millions of 1985 and later model year vehicles. Consequently, manufacturers who must develop a well-engineered, practical, durable and safe aftertreatment system on a mass-production basis for millions of vehicles are seriously prejudiced when the best measure of success in this effort to date consists of one vehicle reaching 12,800 miles before significant deterioration of the system began. Given the state of the record, the Administrator's optimistic predictions are legally insufficient to constitute the finding of technological feasibility required by statute and are therefore clearly arbitrary and capricious.

A. The Diesel Particulate Standards Must Be Technologically Achievable

A necessary prerequisite to the promulgation of any emission standard under Section 202(a)(1) of the Act is the determination by the Administrator that technology to achieve the standard either exists or can be economically developed and applied before the standard becomes effective. Section 202(a)(2).[12] This requirement of economic and technological feasibility is restated in Section 202(a)(3)(A)(iii), the Section invoked by the Administrator as au-

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[12] Section 202(a)(2) mandates that any regulation promulgated under § 202(a)(1) shall not take effect until "after such period as the Administrator finds necessary to permit the development and application of the requisite technology, giving appropriate consideration to the cost of compliance within such period."

thority for the diesel particulate standards.[13] In enacting Section 202(a)(3)(A)(iii), Congress recognized the need to strike a proper balance between the establishment of a statutory timetable for the application of diesel particulate emission standards and the ability of vehicle manufacturers to invent, develop and apply the required technology to production vehicles. In the absence of evidence providing a basis for a statutory mandate requiring a specific percentage reduction of diesel particulate emissions from some uncontrolled level,[14] Congress simply required that the Administrator "prescribe regulations . . . applicable to emissions of particulate matter from . . . vehicles manufactured during and after model year 1981 (or during any earlier model year, if practicable)." Section 202(a)(3)(A)(iii).

Congress conditioned this grant of authority, however, by imposing certain limits upon the Administrator's discretion to promulgate specific particulate standards. The Administrator is required to find that technology to achieve the standards "will be available for the model year to which such standards apply, giving appropriate consideration to

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[13] The full text of Section 202(a)(3)(A)(iii) is as follows:

> "The Administrator shall prescribe regulations under paragraph (1) of this subsection applicable to emissions of particulate matter from classes or categories of vehicles manufactured during and after model year 1981 (or during any earlier model year, if practicable). Such regulations shall contain standards which reflect the greatest degree of emission reduction achievable through the application of technology which the Administrator determines will be available for the model year to which such standards apply, giving appropriate consideration to the cost of applying such technology within the period of time available to manufacturers and to noise, energy, and safety factors associated with the application of such technology. Such standards shall be promulgated and shall take effect as expeditiously as practicable taking into account the period necessary for compliance."

Although § 202(a)(3)(A)(iii) superficially appears to authorize the Administrator to promulgate particulate emission standards for all classes and categories of vehicles, the legislative history reveals that Congress specifically considered particulate standards only with reference to heavy-duty trucks, buses, and motorcycles. *See* H. R. Rep. No. 564, 95th Cong., 1st Sess. 163 (1977) *reprinted in* [1977] U.S. Code Cong. & Ad. News 1502, 1543; Currie, *The Mobile Source Provisions of the Clean Air Act*, 56 U. Chi. L. Rev. 811, 822 (1979). Congressional concern, if any, regarding light-duty particulate emissions, was minimal.

[14] *Compare, e.g.*, Section 202(a)(3)(A)(iii) *with* Section 202(a)(3)(A)(ii).

IN THE

United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 80-1312 and Consolidated Cases
Nos. 80-1464, 80-1710 and 80-1712

NATURAL RESOURCES DEFENSE COUNCIL, INC., *et al.*
Petitioners,

v.

DOUGLAS M. COSTLE, ADMINISTRATOR,
ENVIRONMENTAL PROTECTION AGENCY, *et al.*
Respondents.

On Petitions For Review Of Actions
Of The Administrator Of The
Environmental Protection Agency

BRIEF OF RESPONDENTS

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A. Under Section 202(a)(3)(A)(iii), The Level Of The Particulate Standards Is To Be Technology-Based.

NRDC argues that in establishing the level of the particulate standards EPA was required to consider — but wrongfully excluded — the possible risk that particulate matter from diesel exhaust may be carcinogenic. NRDC Br. at 42-46. NRDC's complaint really reduces to the proposition that particulate standards established under section 202(a)(3)(A)(iii) should be health-based. In support of this argument, NRDC claims that section 202(a)(3)(A)(iii) standards are to be established pursuant to EPA's basic authority under section 202(a)(1). NRDC's claim is both legally and factually wrong.

Section 202(a)(1) authorizes the Administrator to promulgate standards for pollutants "which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare."[28] Simply stated, section 202(a)(1) does not address the *level* of any emission standard; rather, it merely authorizes the Administrator to regulate those emissions which he considers dangerous.[29]

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[28] The full text of § 202(a)(1) is as follows:

Section 202. (a) Except as otherwise provided in subsection (b) —

(1) The Administrator shall by regulation prescribe (and from time to time revise) in accordance with the provisions of this section, standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines, which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare. Such standards shall be applicable to such vehicles and engines for their useful life (as determined under subsection (d), relating to useful life of vehicles for purposes of certification), whether such vehicles and engines are designed as complete systems or incorporate devices to prevent or control such pollution.

[29] Section 202(a)(2) goes on to provide that standards promulgated under subsection (a)(1) "shall take effect after such period as the Administrator finds necessary to permit the development and application of the requisite technology, giving appropriate consideration to the cost of compliance within such period."

Thus, section 202(a)(1) authorizes the Administrator to set standards in addition to those standards mandated by Congress itself.[30]

In the case of particulate matter, Congress has mandated that standards for all classes of diesel vehicles be set, and, consequently, the threshold decision required by section 202(a)(1) is unnecessary. Put another way, Congress has already decided that particulate matter should be controlled. Therefore, it was not necessary for the Administrator before establishing particulate standards to first determine that particulate emissions from light-duty diesel vehicles and light-duty diesel trucks would cause or contribute to air pollution which may reasonably be anticipated to endanger the public health and welfare. This is why the Administrator made no health finding with regard to particulate emissions (although, as discussed below, he did consider and discuss the health risks of particulate emissions during the course of the rulemaking).[31]

Congress not only determined that particulate emissions should be controlled, it specified in some detail the basis on

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[30] Congress has mandated standards to control HC and CO emissions from light-duty vehicles (section 202(b)(1)(A)), NOx emissions from light-duty vehicles (section 202(b)(1)(B)), HC, CO and NOx emissions from heavy-duty vehicles (sections 202(a)(3)(A)(i) and (ii)), and particulate emissions from all classes of diesel vehicles (section 202(a)(3)(A)(iii)).

[31] The situation confronting the Administrator in setting the particulate standard is in marked contrast to that facing him in deciding whether to grant waivers of the NOx standard under section 202(b)(6)(B). With the NOx waivers, a health determination was one of the necessary criteria to be addressed in reaching a decision. Consequently, the Administrator devoted substantial discussion in the waiver decisions to his findings regarding possible health risks of particulates.

which those standards would be set. As is clear from a reading of section 202(a)(3)(A)(iii), the level of the standard is to be solely technology-based:

> Such regulations shall contain standards which reflect the greatest degree of emission reduction achievable through the application of technology which the Administrator determines will be available for the model year to which such standards apply, giving appropriate consideration to the cost of applying such technology within the period of time available to manufacturers and to noise, energy, and safety factors associated with the application of such technology.

The language of section 202(a)(3)(A)(iii) is *identical* to the language in section 202(a)(3)(A)(i), which calls for "interim" (1979-1982) HC, CO, and NOx standards for heavy duty vehicles.[32] The House Report explaining this "interim" standards provision stated that such emission standards must "reflect the greatest degree of emission reduction achievable through use of the technology which will be available in that model year." H.R. Rep. No. 95-294, 95th Cong., 1st Sess. 273

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[32] Section 202(a)(3)(A)(i) provides in relevant part:

> Such regulations applicable to such pollutants from such classes or categories of vehicles or engines manufactured during model years 1979 through 1982 shall contain standards which reflect *the greatest degree of emission reduction achievable through the application of technology which the Administrator determines will be available for the model year to which such standards apply, giving appropriate consideration to the cost of applying such technology within the period of time available to manufacturers and to noise, energy, and safety factors associated with the application of such technology.* (Emphasis added.)

These "interim standards" are part of Congress' overall scheme for controlling HC, CO, and NOx emissions from heavy duty vehicles. In summary, Congress envisioned technology-based interim standards for the 1979-1982 period. Subsequently, unless revised, Congress mandated 90% HC and CO reductions for heavy duty vehicles to take effect for the 1983 model year, and a 75% reduction for NOx for the 1985 model year. Section 202(a)(3)(A)(ii).

(1977) ("1977 House Report"). Thus, from both the language of section 202(a)(3)(A)(iii), as well as from an examination of its twin provision, section 202(a)(3)(A)(i), it is beyond doubt that the level of the particulate standard is to be technology based.

EPA has interpreted this section as mandating a technology-based standard, *see* 45 Fed. Reg. 14496, 14497 (col. 2) (1980); (P-211); J.A. 104, 105. This interpretation of the statute is reasonable and should be upheld. *See Lead Industries Association, Inc.* v. *EPA*, No. 78-2201 (D.C. Cir., June 27, 1980), slip op. at 29-30). Therefore, NRDC's argument that the level of the standards should be health-based must be rejected.[33]

NRDC also claims that EPA failed to consider the possible health risk posed by diesel exhaust. However, NRDC's brief illustrates that the record in this proceeding is replete with material on the possible carcinogenic potential of diesel exhaust. EPA's Regulatory Analysis supporting the particulate standards [34] specifically recognized the possible carcinogenic nature

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[33] NRDC's selective use of *EDF* v. *EPA*, 179 U.S. App. D.C. 43, 50, 548 F.2d 998, 1005 (1976) and *SIPI* v. *AEC*, 156 U.S. App. D.C. 395, 481 F.2d 1079 (1973), (NRDC Br. at 45), does not help its argument. *EDF* v. *EPA* involved the allocation of the ultimate burden of persuasion in pesticide suspension hearings under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, ("FIFRA"), 7 U.S.C. §§136 *et seq.* *SIPI* v. *AEC* dealt with the need for and timing of an environmental impact statement under the National Environmental Policy Act ("NEPA"), 42 U.S.C. § 4332, for the AEC's liquid metal fast breeder reactor program. Neither case alters the basic proposition that section 202(a)(3)(A)(iii) standards are to be technology-based.

[34] Office of Mobile Source Air Pollution Control, Office of Air, Noise, and Radiation, Environmental Protection Agency, Regulatory Analysis of the Light-Duty Diesel Particulate Regulations for 1982 and Later Model Year Light-Duty Diesel Vehicles (February 20, 1980)(P-212) ("Regulatory Analysis").

of particulate matter from diesel exhaust. Regulatory Analysis at 70; J.A. 549. EPA concluded that the health effects data indicated that

> no definitive statement can be made concerning the complete effect of diesel particulate on human health. However, the data available is serious enough to merit caution and diesel particulate should . . . require priority control.

Id. This conclusion was echoed in the final rule. *See* 45 Fed. Reg. 14499 (col. 1) (1980); (P-211); J.A. 107.[35]

Thus, NRDC is inaccurate in its claim that EPA "disregarded the risk." NRDC Br. at 43. More accurately, EPA did consider this issue, but concluded that it could not reach a definite assessment of the risk at that time.

Moreover, the fact that section 202(a)(3)(A)(iii) calls for a technology-based standard does not mean that Congress left the Administrator powerless to protect the public health should greater control of diesel emissions prove necessary to protect the public health. Section 202(a)(4) of the Act authorizes the Administrator to assess the health risks from pollutants such as particulate emissions and further authorizes him to deny or limit certification of diesel vehicles if he determines that such action is needed to avoid an unreasonable risk to the public health, welfare or safety.[36]

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[35] EPA's treatment of cancer risk in establishing the particulate standards and in granting the NOx waivers was not, as NRDC suggests, inconsistent. As discussed in Argument V below, grant of the waiver turns on specific health findings. Accordingly, EPA's explicit consideration in that proceeding of possible cancer risk was appropriate. *See* 45 Fed. Reg. 5480, 5490 (cols. 2-3) (1980); (N-96); J.A. 842, 852.

[36] Section 202(a)(4), 42 U.S.C. § 7321(a)(4), provides in pertinent part:

(A) Effective with respect to vehicles and engines manufactured after model year 1978, no emission control device, system, or element

EPA now has ongoing health studies to attempt to determine the carcinogenic risk (if any) to human health from particulate emissions, and the Administrator has already cautioned manufacturers that "should future results from the diesel health effects studies indicate that further action is necessary to control particulate emissions, EPA will exercise its authority under Title II to do so." 45 Fed. Reg. 14499 (col. 1); J.A. 107.

Thus, far from disregarding the potential health risks, the Administrator is taking a hard look at the health consequences of particulate emissions and will take appropriate action if necessary.

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of design shall be used in a new motor vehicle or new motor vehicle engine for purposes of complying with standards prescribed under this subsection if such device, system, or element of design will cause or contribute to an unreasonable risk to public health, welfare, or safety in its operation or function.

(B) In determining whether an unreasonable risk exists under subparagraph (A), the Administrator shall consider, among other factors, (i) whether and to what extent the use of any device, system, or element of design causes, increases, reduces, or eliminates emissions of any unregulated pollutants; (ii) available methods for reducing or eliminating any risk to public health, welfare, or safety which may be associated with the use of such device, system, or element of design, and (iii) the availability of other devices, systems, or elements of design which may be used to conform to standards prescribed under this subsection without causing or contributing to such unreasonable risk. The Administrator shall include in the consideration required by this paragraph all relevant information developed pursuant to section 7548 of this title.

GENERAL MOTORS RESPONSE TO THE STATEMENTS OF DR. GEORGE McGUIRE, VICE PRESIDENT JOHNSON MATTHEY, INCORPORATED

Attachment II(b)

In his formal statement and verbal testimony before the Senate Environment and Public Works Committee, Dr. McGuire left the inaccurate and misleading impression that particulate control technology, in the form of catalytic particulate traps, is essentially developed and is moving forward to production readiness by the 1985 model year. Dr. McGuire stated that a reliable, reasonably priced particulate control system can be ready for use on the 1985 models and that his firm is proceeding with final design work scheduled for completion by the end of 1981 with production plans to commence in 1982. He projected that the cost of manufacturing this catalyst trap will be well below $100 per unit for a high volume 2.0 liter displacement engine. General Motors tests conducted on Johnson Matthey prototype traps reveal several deficiencies. Our findings compel us to disagree with Dr. McGuire's general conclusions. A more thorough discussion of the basis for our position follows.

Although the particulate trap control concept is a simple one to describe, the ability to make it work safely and reliably on an automobile under all operating conditions is, as yet, an unaccomplished monumental challenge. General Motors believes that an objective assessment of current particulate trap technology would conclude that there are several major design and development problems which must be resolved before it can be decided if catalytic particulate trap technology can become practical for application to production cars. We believe that successful development of a production trap system, applicable across the range of engines and vehicles manufactured by the industry, based on the current state of development, is unachievable within the 1985 timeframe, despite the optimism expressed by Dr. McGuire.

The primary difficulty does not lie in filtering or trapping the particulates emitted from diesel engines. Indeed, a number of filter materials and configurations perform effectively as traps. However, merely trapping particulates does not account for their disposal. The method of disposal of the collected material is an unresolved problem. The volume of particulates and the rate of their collection leads to an impractically short change interval for a "throw-away" or "replaceable cartridge" trap design. A trap concept is needed which will reliably continue its filtration and regeneration cycle for extended mileage, e.g., 50,000-100,000 miles.

Burning the collected particulates appears to be the most practical way to regenerate a trap. Unfortunately, because of the low exhaust temperatures of efficient diesel engines, igniting the collected material is difficult. The Johnson Matthey design, which Dr. McGuire discusses in his testimony, incorporates a catalyst coating on the metal mesh filter material, which has some ability to lower the ignition temperature of the particulates stored in the trap.

Although a catalyst usually is effective in lowering the exhaust temperature required for combustion, to date we have been unsuccessful in finding a catalyst which results in spontaneous, continuous oxidation of the collected particulate throughout the entire range of vehicle operating conditions. Consequently, in order to assure that the trap will regenerate itself, i.e. burn off the collected particulates at the proper intervals, it is necessary periodically to elevate the temperature of the trap through external means. Two experimental methods have been used to elevate the trap temperature and initiate regenerative combustion: 1) throttle the engine air intake, which increases the exhaust temperature and 2) use a burner ahead of the trap.

The Johnson Matthey catalyst proposal is of importance since, with further substantial development, it may enable simpler methods of initiating trap regeneration to be used. General Motors has been working in cooperation with John-

son Matthey, Inc., for over a year to develop better diesel particulate traps. Our testing of the Johnson Matthey catalyst trap technology on cars equipped with GM diesel engines has revealed that several major problems must be solved before the device can be considered practical in an automotive application.

First, in our tests, the catalyst material was deficient in durability, losing its effectiveness to lower the exhaust temperature required for regeneration in less than 5000 miles. Once the catalyst loses its effectiveness, the Johnson Matthey trap no longer can be ignited reliably by engine throttling and would require a more complex auxiliary burner device for regeneration. No such device has yet been perfected.

Another major concern with the Johnson Matthey catalyst trap is its tendency to store and emit sulfates. Sulfur from the fuel is trapped and the catalyst apparently causes sulfate compounds to be discharged in a white cloud during trap regeneration.

Finally, the steel mesh filtration material used in this trap has some undesirable characteristics for use in a vehicle exhaust system. The material creates a high exhaust backpressure when operating at peak trapping efficiency and releases clouds of trapped particulate under medium to high acceleration operating modes. It is also susceptible to "burnout" failure of the fragile steel wool filtration material and when this happens it thereby loses its ability to trap particulates. Clearly, more development and extensive field durability work still is needed.

The critical need is to develop a more reliable trap regeneration system. Presently, experimental engineering systems include a complex collection of hardware. Typically, the following components are needed:

1. A canister located in the exhaust stream containing a filter material.

2. An auxiliary fuel-fired burner to ignite the stored particulate for trap regeneration.

3. An auxiliary air supply for the combustion burner.

4. An auxiliary fuel pump for the burner.

5. An ignition system to ignite the fuel-air mixture.

6. Sophisticated electronic computer controls with associated sensors and actuators able to regenerate the trap at appropriate times during all vehicle operating conditions and for the full life of the vehicle.

Even if such a particulate trap system could be developed, it is clear that it would add significant complexity and cost. Dr. McGuire has estimated the cost of the catalyst to be "well below $100 per unit." By comparison, after experimenting with many trap concepts for the past several years, General Motors estimates the cost of the total *system* necessary to comply with the regulations and perform in the hands of the customer would be on the order of $600. The particulate requirement, coupled with other requirements of the Clean Air Act, poses a potential cost impact on every diesel engine of $900 for emission control in the 1985 model year.

* * *

Letterhead of Hogan & Hartson

Michael P. Walsh
Deputy Assistant Administrator
for Mobile Source Air Pollution
Control
Environmental Protection Agency
ANR-455
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Washington, DC 20460

Dear Mike:

Enclosed are the charts you requested which were taken from slides you viewed during your visit to Daimler-Benz in Stuttgart, West Germany. Please excuse the delay since the last Bi-Monthly meeting in my transmitting these to you, but I have been involved in several other matters and I am just catching up on my back correspondence.

In reviewing the enclosed material, several factors must be kept in mind. First, the test results utilizing the ceramic monolith material were obtained by modifying the engine operation through the retardation of the injection timing. This modification was necessary in order to reach the high exhaust temperatures necessary for burn-off of the particulate matter trapped by the monolith. The modification also led to fuel economy penalties as well as significant deterioration in the cold start performance of the engine. At the present time, Daimler-Benz believes that such a modification in serial production vehicles certainly could not be accomplished and, therefore, even if the ceramic monolith material is found to be acceptable from an engineering standpoint, some type of additional modification must be developed to attain and maintain proper exhaust temperature for use with such a monolith.

With respect to the enclosed material, graph A represents results from flow resistance tests at 1,500 rpm and 3 bar. These results indicate that the monolith shows similar back pressure increases to that of a mat-type filter. These test results were obtained on a Daimler-Benz test bench.

Following the test bench analysis, a similar ceramic monolith unit was installed on a Daimler-Benz vehicle. Smoke numbers were then measured in front of and after the monolith. These results are set forth in graph B which is enclosed. A test monolith was also put through limited durability testing with mileage accumulation of 54,000 km. These test results are set forth in graph C enclosed.

Although the test results set forth in graph C demonstrate the clear potential of a ceramic monolith to reduce particulate matter emissions from diesel engines, it must be recognized that this single test was not representative of the testing performed to date. Other vehicles equipped with basically identical trap oxidizers showed disappointing durability results. As set forth in graph D enclosed, the trap oxidizer was thermically damaged at approximately 6,000 km. In yet another test vehicle particulate matter emissions increased from 0.096 g/m to 0.326 g/m over a distance of only 1,511 km. Accordingly, these various test results which identify problems with the operational character of the ceramic monolith, particularly when considered in light of the need to retard injection timing to an unacceptable level in order to carry out the testing, indicate that significant amounts of additional work must be carried out before this technology can be available for serial production.

You are aware, that Daimler-Benz is presently attempting to obtain additional information from tests which are being carried out at their Denver, Colorado laboratory. The final analysis of these test results will not be completed for some time.

Following your review of the enclosed material, if you have any questions or if I have failed to provide you with copies of all the material you saw during your visit to Daimler-Benz, please do not hesitate to contact me.

Best regards.

Sincerely,

/s/ PATRICK M. RAHER
Patrick M. Raher

PMR: jeh

Enclosures

cc: Mr. Karl-Heinz Faber

IN THE

United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 80-1464

GENERAL MOTORS CORPORATION, Petitioner,
MERCEDES-BENZ OF NORTH AMERICA, INC., *et al.*, Intervenors,
v.
DOUGLAS M. COSTLE, Administrator,
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No. 80-1312

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GENERAL MOTORS CORPORATION, *et al.*, Intervenors.

No. 80-1710

MERCEDES-BENZ OF NORTH AMERICA, INC., Petitioner,
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DOUGLAS M. COSTLE, Administrator,
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NATURAL RESOURCES DEFENSE COUNCIL, INC.,
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Environmental Protection Agency, Respondent.

On Petition for Review of Final Action of the Administrator, Environmental Protection Agency

REPLY BRIEF OF PETITIONER GENERAL MOTORS CORPORATION

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standards will take effect. The Administrator would not be required to prescribe the most stringent standards achievable, however, for § 202(a)(1), unlike § 202(a)(3)(A)(iii), does not require that the standards "reflect the greatest degree of emission reduction achievable."[6]

The 1982 light-duty vehicle particulate standards promulgated by the Administrator are technologically and economically achievable, do not endanger health, and thus would satisfy the requirements of § 202(a)(1) and § 202(a)(2). Although not necessary under § 202(a)(1), these standards, as the Administrator has determined, reflect the greatest reduction of emission control that is achievable within the available lead time. 45 Fed. Reg. at 14,497, col. 2 (JA 105). The 1985 particulate standards, however, cannot be sustained under § 202(a)(3)(A)(iii) or § 202(a)(1) because of their patent technological infeasibility. As the remainder of this Brief will demonstrate, the Administrator failed to support his prediction of the achievability of the 1985 standards. Absent reliable proof to support the Administrator's decision that the standards will be technologically and economically achievable by 1985, the standards are invalid under both § 202(a)(1), as modified by § 202(a)(2), and § 202(a)(3)(A)(iii).

II. THE ADMINISTRATOR HAS FAILED TO ADDUCE PROOF OF TECHNOLOGICAL ACHIEVABILITY OF THE 1985 PARTICULATE STANDARDS SUFFICIENT TO FULFILL APPLICABLE STATUTORY DIRECTIVES AND THE REQUIREMENTS OF REASONED DECISION-MAKING

Because its 1985 particulate standards are based on an overly optimistic assessment of current evidence of technological achievability, EPA is confronted with the possible elimination of fuel-efficient diesel technology that Congress sought to promote. *See, e.g.*, 45 Fed. Reg. 5480, nn.

[6] Section 202(a)(1) also would not require that the standards apply during and after model year 1981. *Compare* § 202(a)(3)(A)(iii).

Regulatory Analysis

Light-Duty Diesel Particulate Regulations

Environmental Protection Agency
Office of Air, Noise, and Radiation
Mobile Source Air Pollution Control

Approved by:

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for Mobile Source Air Pollution Control

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CHAPTER I

SUMMARY

A. Background

Light-duty vehicles powered by diesel engines are projected to be a significant source of particulate emissions in the late 1980's. Currently, this is not the case due to the small number of light-duty diesels on the road today. By 1990, though, it is projected that diesels could comprise as much as 20 percent of light-duty vehicle sales. By 1990, they are projected to become the seventh largest source of particulate emissions and to have the third greatest available potential for total particulate emission reduction of any source, mobile or stationary. The majority of these emissions will occur in urban areas, where the total suspended particulate problems are most acute.

Based on the above and the fact that Congress has required the control of particulate emissions from these vehicles through the 1977 Amendments to the Clean Air Act, EPA is establishing emission standards to control particulate emissions from light-duty vehicles and trucks powered by diesel engines. Also included are changes in the test equipment and procedures currently used to measure gaseous emissions from these vehicles. These changes will allow the measurement of particulate emissions concurrently with the measurement of the currently regulated gaseous emissions without affecting the stringency of current gaseous emission standards.

B. Proposed Rulemaking

Section 202(a)(3)(A)(iii) of the Clean Air Act as amended, requires the Administrator to prescribe particulate emission standards by the 1981 model year. It is under this authority that EPA is now promulgating Federal light-duty diesel particulate emission standards for 1982 and later model year vehicles. The changes to the existing regulations include:

1. The addition of a dilution tunnel and other equipment to measure particulate emissions;

2. The implementation of exhaust emission standards for particulate matter from diesel-powered light-duty vehicles and light-duty trucks of 0.60 gram per mile (0.37 gram per kilometer (g/km)) beginning with the 1982 model year; and

3. The reduction of the standards to 0.20 g/mi (0.12 g/km) for diesel-powered light-duty vehicles and 0.26 g/mi (0.16 g/km) for diesel-powered light-duty trucks beginning with the 1985 model year.

CHAPTER IV

STANDARDS AND TECHNOLOGY

A. Background

1. Basis and nature of standards

The first federal air pollution legislation was the Air Pollution Control Act passed by Congress in 1955. It was not until

1963, however, that the federal government confronted the seriousness of the air pollution problems then facing the United States. Finding that "the predominant part of the Nation's population is located in its rapidly expanding metropolitan and other urban areas, which generally cross the boundary lines of local jurisdictions and often extend into two or more states,"[1] and that "the growth in the amount and complexity of air pollution brought about by urbanization, industrial development, and the increasing use of motor vehicles, has resulted in mounting dangers to the public health and welfare, including injury to agricultural crops and livestock, damage to and the deterioration of property, and hazards to air and ground transportation,"[2] Congress passed the Clean Air Act of 1963 to (among others) "protect the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population."[3] Since that time, Congress has modified the Clean Air Act with the Motor Vehicle Air Pollution Control Act of 1965, the Clean Air Act Amendments of 1966, the Air Quality Act of 1967, the Clean Air Act Amendments of 1970, and the Clean Air Act Amendments of 1977.

In view of the substantial air pollution contribution made by motor vehicles, and the transient, interstate nature of their usage, the Administrator of the Environmental Protection Agency (EPA) has been given broad authority to: "prescribe (and from time to time revise) in accordance with the provisions of this section, standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines, which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare."[4] In many cases, Congress itself has mandated specific motor vehicle emission reductions, as with hydrocarbon (HC), carbon monoxide (CO), and nitrogen oxides (NOx) emissions.

As a result of the concern over the public health and welfare implications of an increasingly dieselized motor vehicle population, Congress approved an amendment to the Clean Air

Act in 1977 that mandates the particulate regulations for motor vehicles. Section 202(a)(3)(A)(iii) states that: "The Administrator shall prescribe regulations under paragraph (1) of this subsection applicable to emissions of particulate matter from classes or categories of vehicles manufactured during and after model year

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[Excerpt from page 51 of Regulatory Analysis.] GM reported some particle blow-off and self incineration.

[Footnote omitted]

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